The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

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NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

The prepaid subscription to THE CHEMICAL AGE *is 21s. per annum for the United Kingdom, and 26s. abroad. Cheques, Money Orders, and Postal Orders should be made payable to Benn Brothers, Ltd.*

Benn Brothers, Ltd., proprietors of THE CHEMICAL AGE, *have for some years past adopted the five-day week, and the editorial and general offices (Bouverie House, 154, Fleet Street, London, E.C.4), are closed on Saturdays.*

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Chemicals at the B.I. Fair

THE Chemical Section of the British Industries Fair is, as in past years, to be located in London, though exhibits of indirect interest to the chemical industry will also be shown at Birmingham, and also, as in past years, it will be in the capable hands of the Association of British Chemical Manufacturers. The London Section will be housed this year in the new Olympia, instead of in the rather straggling buildings at the White City, and the chemical exhibits will be found on the ground floor of the Main Hall annexe. The plan of the Chemical Section, published in this issue, contains a list of the exhibitors and shows its representative character, including heavy and fine chemicals, dyestuffs, and the usual side branches. There will be no collective exhibit of chemical plant, but the British Chemical Plant Manufacturers' Association will have an office where information affecting its activities will be available to inquirers.

The satisfactory advance in chemical export trade during the past year should be an inducement to chemical exhibitors to take the fullest advantage of the opportunity to let overseas buyers and visitors know what this country produces. Inquiries continue to reach us from distant parts of the Empire—one arrived only this week from Rangoon—asking for information as to suppliers of chemical wares. It is, of course, a pleasure to put these inquirers into touch with British firms able to meet their requirements, but the number of communications of this character that reach us indicate some weakness in their publicity schemes. Either they employ the wrong media, productions that are not read or do not go to the right people, or their own presentation of their products is unskilful. The Olympia Fair should be a good opportunity for new points of contact with overseas business men, and firms that go to the cost of exhibiting should see that their representatives possess the necessary life and imagination for dealing suitably with inquiries, instead of treating the whole thing as if it were a bother. The organisation of the Chemical Section, year after year, has had a decidedly educational effect on chemical firms in this matter, and it is to be hoped that the exhibitors will reap substantial gains from their enterprise. The Fair, both in London and at West Bromwich, opens on Monday next, and will continue open until Friday week.

Industry Lagging Behind Science

PERHAPS, as an example of the British manufacturers' supposed slowness in turning scientific discoveries to industrial use, no case has been more often quoted than that of Perkin's production of the first coal-tar dye. First in the field, we allowed the commercial initiative to pass into the hands of Germany, and it has cost us more than ten years of hard and costly effort to recover the lost ground. This charge against British industrialists is often resented as groundless and unjust, yet in the new report of the Department of Scientific and Industrial Research the criticism is revived in temperate but deliberate terms. The large group of research associations that have been brought into existence within the past decade are, it is confidently said, exerting a profound effect on British industry, but regret is expressed that the results achieved by research are not being applied and utilised in industries to a greater extent. There is still, it is stated, too big a gap between the completion of a successful investigation and the application of its results in practice. The Board are so sensible of this gap that they recommend that it should be bridged or reduced, even at the cost of slowing up research.

This opinion, it is worth noting, is based on a thorough personal inquiry into the working of the research associations, and it is unlikely that it would be expressed by so responsible an authority without good reason. We can recall no occasion on which, in an official report, it has been laid down so clearly that industry is not keeping pace with the recent advances

of science. As against this, however, there is a suggestion that the research worker equally needs to appreciate. It is the suggestion that the results of scientific investigation should be presented in a manner that can be readily understood and appreciated by manufacturers. The pure scientist, intensively interested in his own problems and thinking of them habitually in his own terms, falls easily into the trap of stating in the language of the laboratory results which the plain business man requires to be described in reasonably simple business terms, if he is to understand them. Not until the business man appreciates more truly the nature and purpose of research, and the abstract chemical expert learns to look at things from the industrialists' point of view as well as from his own, will either party derive the full benefit he is meant to receive from the work of the other.

Sir Harold Hartley's Appointment

WE have already heard Sir Harold Hartley's appointment as vice-president and director of scientific research to the L.M.S. Railway Co. (announced in THE CHEMICAL AGE of last week) described as "a feather in the cap of science." That, we imagine, will be the common verdict of chemists, and, indeed, of all who desire to see industry constantly informed and refreshed by science. If Sir Josiah Stamp is responsible, as he is reputed to be, for the new post and the selection of its first occupant, he is to be equally congratulated on both. Sir Harold Hartley's qualifications for such an office and his wide scientific and industrial experience were mentioned last week. The satisfaction at his choice will be increased by the later information as to the wide scope of his office. The sciences of engineering, physics, metallurgy and chemistry are at the very foundations of our railway services, but they are still capable of application in numerous ways leading to increased safety, comfort, and mechanical and economic efficiency. There is immense scope for a scientific directorate with the proper degree of imagination and commercial sense, and there will be widespread satisfaction that so high and responsible a post has fallen to a distinguished chemist. The announcement that Sir Harold Hartley is forming a council of competent scientists to assist him in the work is an excellent first step that promises well for so important an experiment.

"Chemistry and War"

SEVERAL readers have been good enough privately to express their satisfaction, as Dr. Brightman does openly in this issue, at the views we expressed last week on the attitude of chemists towards war and war preparations. No one familiar personally with those who took part in the discussion of Dr. Levinstein's paper can suppose them for a moment to be more indifferent than the rest of us to the cause of peace or less conscious of the catastrophe another war would be. Those who have heard them singing the Songs of Zion or chanting the Psalms of David will need no assurance on the point. But there is one risk in these discussions.

The chemist, like other folk, has a professional pride, and when he hears the use of any chemical product in war denounced as diabolical, while high explosive shell, bayonet charges, bombing from the air, tanks, submarines and all the other atrocities are placidly accepted as legitimate and even rather splendid, his impulse is vigorously to protest against such unconscious hypocrisy. It is only natural. But in making that protest it is important to distinguish between a comparative defence of chemical warfare against illogical attacks and a positive advocacy—or what may be mistaken for such—of chemical warfare itself, or of war as an institution. There is a danger that the failure to make that distinction may put chemistry in quite a false position with the public and lead to a widespread popular impression that chemistry—and indeed science in general—is a servant of war instead of the constant servant of peaceful industry and progress. That would be disastrous. It was to draw attention to this risk that we put into plain words the inarticulate but decided thoughts of many present at the meeting, and emphasised the careful orientation on such points that distinguished Dr. Levinstein's own paper.

Books Received

A TEXTBOOK OF ELEMENTARY QUANTITATIVE ANALYSIS. By Carl J. Engelder. London: Chapman and Hall, Ltd. Pp. 254. 13s. 6d.

THE PROBLEM OF OIL. By Christopher T. Brunner. London: Ernest Benn, Ltd. Pp. 231. 15s.

REPRINTS FROM THE SMITHSONIAN REPORT FOR 1928. U.S. Government Printing Office:—

New Results on Cosmic Rays. By R. A. Millikan and G. H. Cameron. (Pp. 213–231.)

Three Centuries of Natural Philosophy. By W. F. G. Swann. (Pp. 233–247.)

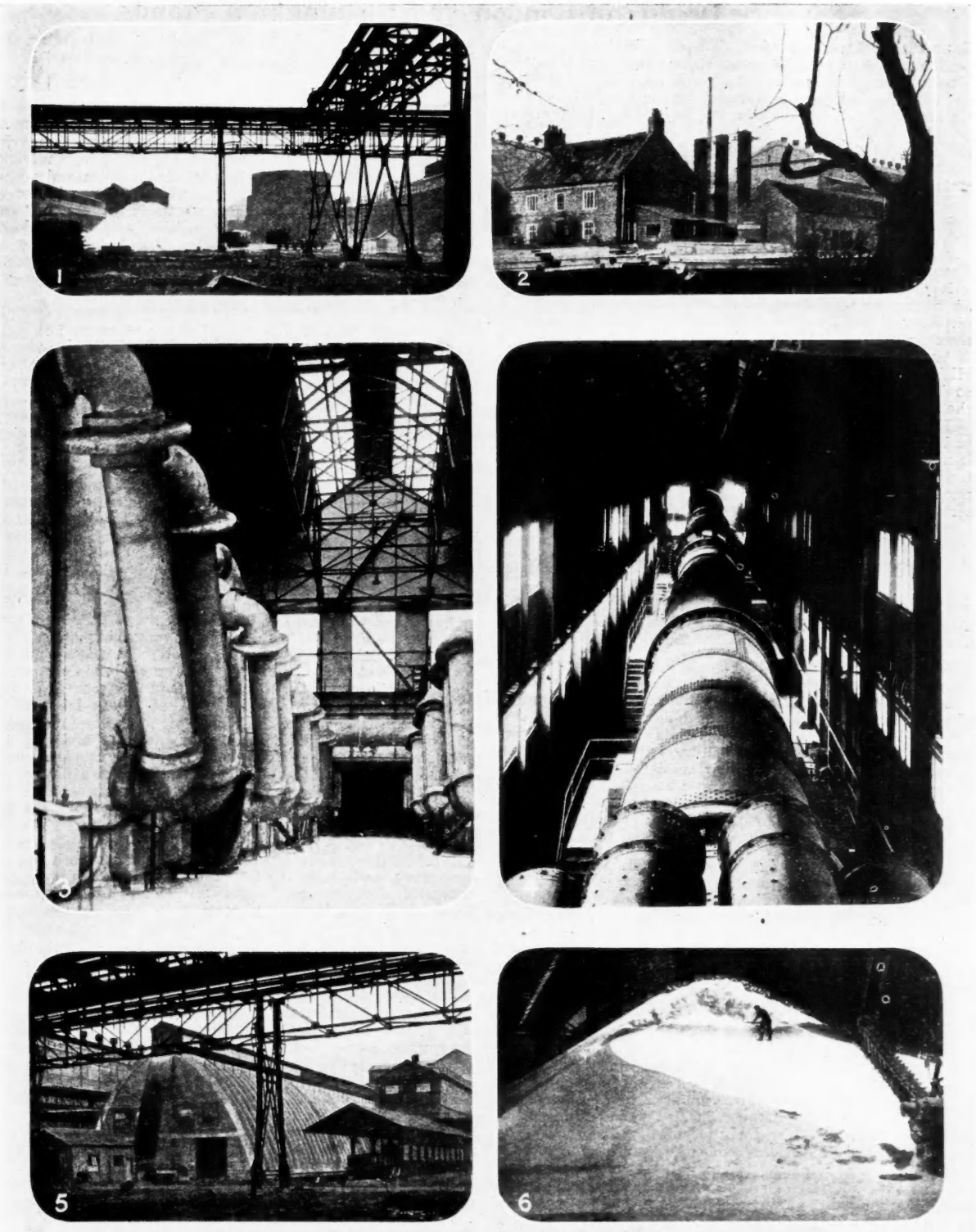
Svante Arrhenius. By Sir James Walker. (Pp. 715–735.)

Theodore Willlam Richards. By Gregory P. Baxter. (Pp. 737–747.)

The Calendar

Feb. 17 & 24	Royal Society of Arts. Cantor Lecture: "Recent Improvements in Methods of Brickmaking." A. B. Searle. 8 p.m.	John Street, Adelphi, London.
18 & 19	Society of Glass Technology meetings.	Applied Science Department University, Sheffield.
19	Institute of Chemistry (London and S.E. Counties Section): "Medico-Legal Chemical Work in Egypt." Mr. W. M. Colles. 7 p.m.	30, Russell Square, W.C.1.
26	Institution of Chemical Engineers: "The Formation and Growth of Crystals." Prof. W. E. Gibbs. 8 p.m.	Burlington House, Piccadilly, W.1.
Mar. 1	British Association of Chemists (London Section): Annual dinner.	Hotel Belgravia, London.
3	Royal Society of Arts. Cantor Lecture: "Recent Improvements in Methods of Brickmaking" (III). A. B. Searle. 8 p.m.	John Street, Adelphi, London.
5	Royal Society of Arts: "Brewing as a Branch of Science." Prof. A. R. Ling. 8 p.m.	John Street, Adelphi, W.C.2.
5	Society of Public Analysts. Annual meeting. 8 p.m.	Burlington House, Piccadilly, W. 1. Bristol.
6	Institute of Fuel: "The Cleaning of Coal." Dr. F. S. Sinnatt	
21	Society of Chemical Industry. Joint meeting of Manchester and Liverpool Sections: "Flour Milling." Mr. J. Twomey. 6 p.m.	Muspratt Lecture Theatre, Liverpool University.
27	Chemical Society. Anniversary Dinner. 7.30.	Hotel Victoria, Northumberland Avenue, W.C.2.
28	Society of Dyers and Colourists' Annual Dinner. 7 p.m.	Hotel Metropole, London.

Some Recent Views at the Billingham (I.C.I.) Works



1.—Pipe Bridges Linking up Different Plants. 2.—The Grange Offices, with Carbonators and Sulphur Grinding Plant. 3.—Part of Plant for Converting Water Gas into Hydrogen. 4.—Rotary Cement Kiln, 283 ft long. 5.—An Ammonium Sulphate Silo, with Pipe Bridge. 6—Interior of Sulphate Silo, Showing Scraper Method of Removing the Salt. (*Reproduced from I.C.I. Magazine*).

Chemicals at the British Industries Fair

Advance Details of London and Birmingham Stands

SOME ten thousand square feet will be occupied by the chemical section at the 1930 British Industries Fair, which opens on Monday next, February 17, at its new home in the enlarged Olympia, London, and simultaneously at Castle Bromwich, Birmingham. It will remain open until Friday, February 28. At Olympia this year the various sections will not be separated to the same extent as they were at the White City and the chemical exhibits will be housed on the ground floor in the Main Hall annexe, close to the druggists' sundries section.

The arrangements for the chemical section are under the auspices of the Association of British Chemical Manufacturers, 166, Piccadilly, W.1, who will have an office on stand No. B.75, to deal with any inquiries in regard to chemicals. There will be no collective exhibit of chemical plant, but the British Chemical Plant Manufacturers' Association will have an office on stand B.74, which will distribute the official directory of the Association and answer inquiries on plant for the chemical and allied industries.

An appeal to employers is being made by Sir Charles Higham, urging them to buy tickets for their workpeople so that they may visit the Fair in the evenings and see displayed the finished product of their labours.

The CHEMICAL AGE reminds its many subscribers, advertisers and contributors that its stands at the British Industries Fair, London (D. 170) and Birmingham (8-G.1), offer special facilities as a rendezvous for business acquaintances. Telephones have been installed for the use of our visitors, and the services of our staff are available for conducting personal correspondence.

The London Chemical Section

Prospective Exhibits at Olympia

THE following are notes on the stands of the chief chemical firms who will be exhibiting at Olympia :—

Albright and Wilson, Ltd., OLDBURY, near BIRMINGHAM (**stands B.90 and 95**), in addition to showing phosphorus and its many derivatives, will exhibit special preparations of a very high standard of purity, such as carbon tetrachloride (technical and medicinal), ammonium persulphate, pure precipitated sulphur, and the well-known aerating materials "Antelope" and "Ibex." Their special display of silicon ester will be of general interest, and as well as illustrations of its use as a paint medium they have arranged, in conjunction with Raines and Porter, to demonstrate its employment in the preservation and restoration of stone and brickwork.

The Aluminium Plant and Vessel Co., Ltd., WANDSWORTH, S.W. (**stand B.101**), are to show a wide range of chemical plant consisting of welded sheet metal, and of cast alloys. There will also be a special varnish cooking plant, suitable for the manufacture of stand oils and the latest departure in the manufacture of these and kindred thickened oils. The company have been devoting considerable attention to the welding of copper and of nickel and examples of plant made by their processes will be shown.

A. Boake Roberts and Co., Ltd., CARPENTER'S ROAD, STRATFORD (**stands B.91 and 94**), are seeking to display the full range of their fine and technical chemicals, which means that there will be over 700 separate specimens on the stand. Among their essential oils will be found certain intermediates of prime importance, and they will also show perfumes and perfume bases. Amongst their technical chemicals will be liquid sulphur dioxide in glass syphons, tin and iron cylinders, and specimens of sulphites, bisulphites, and metabisulphites, together with phosphates, saponines, and sulphonated oils. A further section will be devoted to solvents, plasticisers, gums and resins and chemicals used for food products. One of the most interesting sections will be a special display of some 30 fine chemicals which are now shown for the first time. It will include the "A.P.V." heat exchanger for heating and cooling liquids, a plate heat exchanger so arranged that when ready for work a series of channelled plates are held in close proximity to each other, forming a series of tubes. When the machine is opened the plates fall apart and are accessible for cleaning without any of the difficulty which is experienced with a tubular cooler.

The British Cyanides Co., Ltd., of 49, WELLINGTON STREET, STRAND, LONDON (**stands B.50 and 55**), in conjunction with the Beetle Products Co., Ltd., of Pope's Lane, Oldbury, Worcester, will be showing their synthetic resins and white and coloured moulding powders. There will again be a demonstration of a moulding plant in operation, and the public will be able to see articles actually moulded from Beetle powders. Beatl Sales, Ltd., will display a wide range of moulded articles in attractive colours and mottled effects, as produced by the various firms using Beetle moulding powders.

The British Drug Houses, Ltd., GRAHAM STREET, LONDON, E. (**stands B.73 and 76**), have added interesting new products to their list of medical specialities, including acetylcholine, which is used in the treatment of Raynaud's Disease, cramps, dead fingers, defective vision and other complaints arising from arterial hypertension; and iodised tincture of guaiacol which has achieved considerable success in cases of tubucular meningitis, infantile paralysis, convulsions, pleurisy and other acute infections. The display will be devoted especially, however, to discoveries of new properties connected with existing products, notably B.D.H. vitamin products—radiostol, radiostoleum and radio malt, and also the substance "S.U.P. 36," described last year following the publication by a physician of reports on its value in cases of influenza; and medicinal glucose, extensively employed in cases of asthma.

Burroughs Wellcome and Co., Ltd., SNOW HILL BUILDINGS, LONDON (**stand B.71**), with a view to providing an exhibit which will be at once educational and attractive, have prepared for inclusion in their display of "Wellcome" brand chemicals and galenicals a collection of crystals containing some exquisite examples. They have all been prepared in the laboratory, as distinct from naturally occurring crystalline minerals. The display will include examples of inorganic and organic substances used in general chemical work, complex salts, alkaloids, and also other chemicals which have a particular interest from their pharmaceutical or medicinal use.

J. Bush and Co., Ltd., ASH GROVE, HACKNEY, LONDON (**stands B.89 and 96**), in addition to their flavouring essences and essential oils, show a wide range of fine chemicals used in perfumery and other trades. Among them are vanillin, coumarin, heliotropine, terpineol, phenyl, ethyl alcohol, amyl cinnamic aldehyde, together with pure isolates, e.g., geraniol, anethol, iso eugenol, etc. There is a full range of terpeneless oils, and examples of intermediates in the aniline dye and other industries. There will also be a display of harmless food colours for all purposes.

The General Chemical and Pharmaceutical Co., Ltd., of WILLESDEN (**stand B.77**), are exhibiting examples of "Judex" analytical reagents, each one of which is guaranteed to conform to the recognised English standards. The firm's catalogue, it is claimed, contains the most complete English list of analytical reagents yet published, and will be sent to *bona fide* inquirers applying on their trade letter paper. The company is prepared to consider the manufacture, even in small quantities, of the less usual chemicals required for research work, and this policy has resulted in the successful production of a number of research chemicals, not previously manufactured within the Empire. A number of the company's "Vulcan" chemicals, for electroplating and process engraving, are shown, including silver salts and compound nickel salts such as nickel potassium cyanide. In addition, there is an exhibit of "Oasis" high purity accumulator acid. The company offers attractive prices for export and pays special attention to export packing.

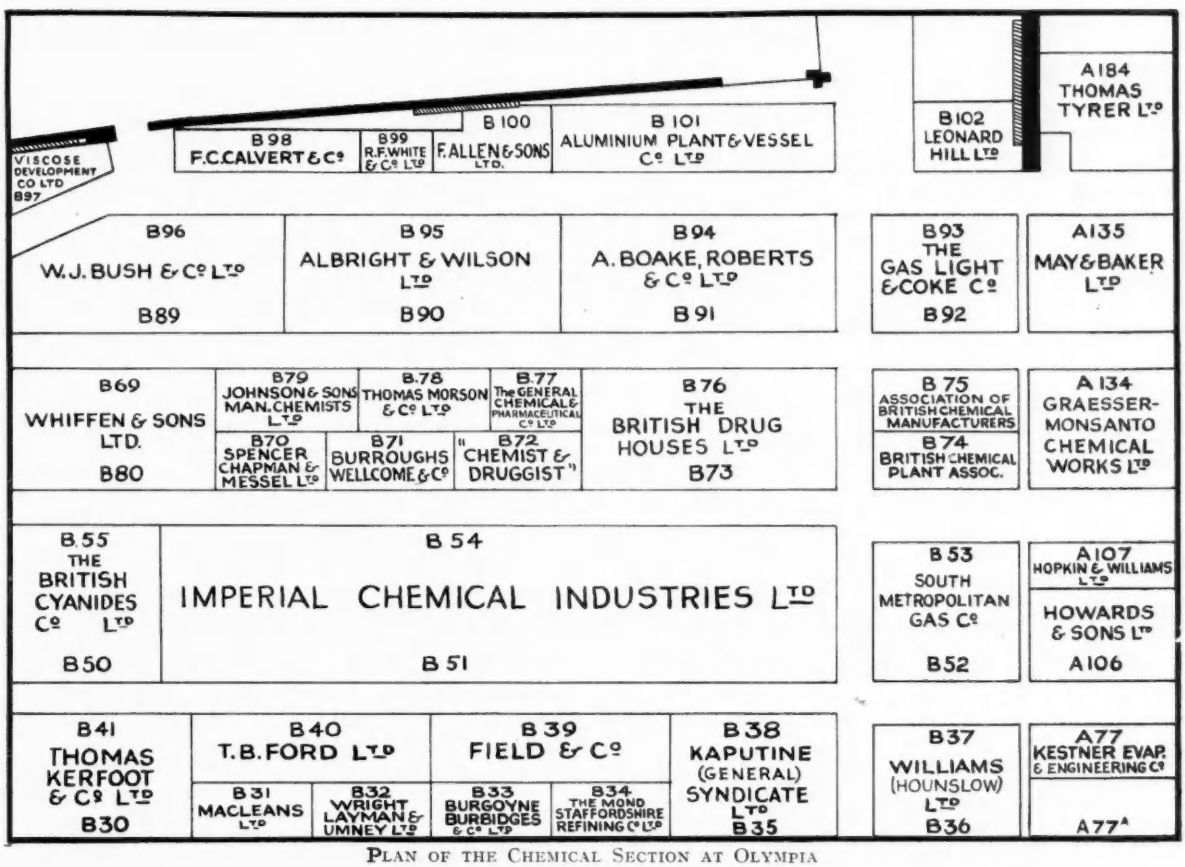
The Gas Light and Coke Co., Horseferry Road, London, S.W.1 (**stands B.92 and 93**), exhibit their well-known series of by-products and several grades especially adapted for modern requirements. Pitch can now be produced to specified penetration tests for road work according to buyers' requirements, and other lines are road tar in standard grades and to specification, creosote, naphthalene in every grade up to the highest commercial purity, the complete series of benzoles and their allied products, crystal carbolic acid manufactured to pharmacopœia standards, liquid carbolic acids in standard grades naphthalene, and dry neutral non-caking crystal sulphate of ammonia.

The Graesser-Monsanto Chemical Works, Ltd., of London and Ruabon, North Wales (**stand A.134**), are again showing their phenol, salicylic acid, vanillin and saccharine products. The phenol section includes carbolic acid, ice crystals 40–41° C., carbolic acid detached crystals 41° C. and carbolic acid liquefied crystals, together with cresylic acid and cresol derivatives. The salicylic acid will be shown as pure crystals of extreme whiteness, while the Vanillin-Monsanto appears as 100 per cent. pure crystals made from pure clove oil. A new product of this firm is methyl salicylate used to mask disagreeable odours in fly sprays, insecticides, mouth washes, perfumes, tooth pastes and embrocations.

Hopkin and Williams, Ltd., 16, Cross Street, Hatton Garden, London (**stand A.107**), includes among their exhibit of A.R. chemicals many reagents in the form of a crystalline powder. Amongst organic reagents for analysis they are showing dimethyl glyoxime, B-hydroxy-quinoline, nitroso-B-naphthol and sulphanilic acid. Standard reagents for the preparation of buffer solutions for hydrogen ion determination, are shown in grades specially prepared for electrodes, and a representative collection of indicators for the colorimetric method. Standard sets of sealed buffer solutions containing the more generally used indicators are also shown, completing a comprehensive exhibit of chemicals for determinations of hydrogen ions. Other sections of the display include stains in solid form and compound stains in solution, covering all branches of microscopy; solutions for mineral separation for geological research; radio-active uranium bearing minerals and products; sodium bismuthate, and barium sulphate for X-ray diagnosis.

Hopkin and Williams (Travancore), Ltd., 16, Cross Street, Hatton Garden, London (**stand A.107**), are showing an interesting collection of rare-earth minerals, the most important of which is monazite sand from Travancore, a source of supply within the Empire. The Travancore sand up to the present is the richest in thorium oxide of any sand produced in quantity in the whole world. The mineral zircon sand is a zircon silicate from which is prepared a white zirconium oxide, employed for the manufacture of bricks for lining high-temperature furnaces. It has also found a use in replacing white tin oxide as an "opacifier" in the manufacture of white resistant enamels.

Howards and Sons, Ltd., Ilford (**stand B.106**), will be exhibiting their usual range of solvents and plasticisers, well


VISCOSE DEVELOPMENT CO LTD B97
B98 F.C.CALVERT & Co
B99 R.F.WHITE & Co LTD
B 100 F.ALLEN & SONS LTD.
B 101 ALUMINIUM PLANT & VESSEL Co LTD
B102 LEONARD HILL LTD
A184 THOMAS TYRER LTD
B96 W.J. BUSH & Co LTD B89
B 95 ALBRIGHT & WILSON LTD B90
B94 A. BOAKE, ROBERTS & Co LTD B 91
B93 THE GAS LIGHT & COKE Co B92
A135 MAY & BAKER LTD
B69 WHIFFEN & SONS LTD. B80
B79 JOHNSON & SONS MAN. CHEMISTS LTD
B.78 THOMAS MORSON & Co LTD
B.77 The GENERAL CHEMICAL & PHARMACEUTICAL Co LTD
B70 SPENCER CHAPMAN & MESSEL LTD
B71 BURROUGHS WELLCOME & Co
B72 "CHEMIST & DRUGGIST"
B76 THE BRITISH DRUG HOUSES LTD B73
B 75 ASSOCIATION OF BRITISH CHEMICAL MANUFACTURERS
B74 BRITISH CHEMICAL PLANT ASSOC.
A 134 GRAESSER-MONSANTO CHEMICAL WORKS LTD
B.55 THE BRITISH CYANIDES Co LTD B50
B 54 IMPERIAL CHEMICAL INDUSTRIES LTD B 51
B 53 SOUTH METROPOLITAN GAS Co B52
A107 HOPKIN & WILLIAMS LTD
HOWARDS & SONS LTD A106
B41 THOMAS KERFOOT & Co LTD B30
B40 T.B. FORD LTD
B 39 FIELD & Co
B38 KAPUTINE (GENERAL) SYNDICATE LTD B35
B37 WILLIAMS (HOUNSLOW) LTD B36
A77 KESTNER EVAP. & ENGINEERING Co
B 31 MACLEANS LTD
B32 WRIGHT LAYMAN & UMNEY LTD
B33 BURGOYNE BURBIDGES & Co LTD
B34 THE MOND STAFFORDSHIRE REFINING Co LTD
A77A

Plan of the Chemical Section at Olympia

Imperial Chemical Industries (stands B.51 and 54), have an imposing structure with a completely equipped cinema hall in the centre, surrounded externally with alcoves in which are exhibited the main products of the concern. In each alcove is a picture painted by Mr. Percy Smith, symbolic of the particular activities of the company represented. Products known in the cellulose and lacquer industry, together with their sextol and cyclo-hexanol products for use in soap, textile, dry cleaning, laundry and other industries. The paint, lacquer and varnish trades will be interested in sextone, sextone B, ethyl lactate and dicaetone alcohol, the two latter being particularly valuable for the production of flow and brushing properties in the new brushing lacquers, whilst they are at the same time powerful solvents for cellulose acetate. Among the firm's fine chemicals will be found thymol and synthetic menthol, aspirin, ethers, iodides, mercurials, quinines, bismuth compounds, bromides, camphor and salicylates.

dealt with in this manner include dyestuffs, fertilisers, sporting ammunition, paints and lacquers, leather cloth and lightning "Zipp" fastener, all of which are important sub-sections. On each end of the stand the visitor is compelled to visualise the world-wide interests of I.C.I. For example, at the main entrance there is a glass globe of the world, on which is indicated the British Empire in red, and in blue the different places throughout the world where I.C.I. has direct connections. At the other end there are numerous sample packages exactly as they leave the different factories for distant countries, and actual posters and showcards used in foreign lands. In the cinema itself films descriptive of some of Imperial Chemical Industries' activities are shown, including one depicting life at a great chemical factory at Wallerscote and another at I.C.I. Metals, Ltd., Birmingham. Other films deal with high-explosives manufacture, the dye industry, the progress in agriculture and clay bird shooting.

Johnson Matthey and Co., Ltd., 73, HATTON GARDEN, E.C.1 (**stands D.110 and 123**), are exhibiting precious metals as supplied for industrial purposes. Of interest to the chemical trade will be gold, silver, platinum and metals of the platinum group in their various forms of sheet, wire, tube, salts and general scientific apparatus, including platinum gauze and condensing tubes. The latest samples of ceramic colours and oxides for use in the pottery and glass trades will also be on view.

Johnson and Sons (Manufacturing Chemists), Ltd., HENDON, LONDON (**stand No. B.79**), are exhibiting a full display of the photographic developing agents such as amidol-Johnsons, metol-Johnsons, pyro-Johnsons, glycin-Johnsons, azol, and all forms of the ready-made developers in solution and powder for all branches of the profession. A display of fine chemicals will include the salts of precious metals, such as gold chloride, silver nitrate, silver vitellin, etc.; and a whole series of test books and caustics and pharmaceutical preparations. There will also be a collection of chemicals and collodions as required by the process engraver.

Kestner Evaporator and Engineering Co., Ltd., 5, GROSVENOR GARDENS, S.W.1 (**stand A.77**), owing to the restriction of space, are naturally unable to show plant that is in any way representative of the type of work that they carry out. Amongst their exhibits, however, will be a number of photographs, showing some typical installations, plant models and samples indicating products that can be obtained. Items of particular interest on the stand are a Kestner patent oilelectric plant and a working model of the Kestner vortex stirrer. Members of the technical staff will be available to give information regarding plant and to discuss any other chemical engineering problems. Besides the construction of evaporators, drying plant, filters, crystallisers, acid pumps, etc., the firm also builds special plant in conjunction with its clients for the development of new processes.

May and Baker, Ltd., GARDEN WHARF, BATTERSEA (**stand A.135**), will be exhibiting their extensive range of pharmaceutical and industrial chemicals. Their organic arsenic compounds are of outstanding interest owing to the fact that recent progress in medical science has shown their many-sided applications in the treatment of tropical and other diseases throughout the world. They include Neovarsenobilon (N.A.B.), for the treatment of syphilis; stovarsol, widely used in the treatment of amoebic dysentery, yaws, and tick fever; quinine-troposan, for malaria; parosan for disseminated sclerosis and neuro-syphilis; and tryparsamide, manufactured as sole licensees in Great Britain of the Rockefeller Institute of New York. The series of hypnotics include Gardenal, Soneryl and Rutonal, the first of which is now widely used in the treatment of epilepsy. On the industrial side the firm is stated to be the largest manufacturer of mercurial preparations in the Empire. The development of export trade has led to the establishment of separate organisations in India and Canada, the firms of May and Baker (India), Ltd. and May and Baker (Canada), Ltd., having been incorporated during the past twelve months with head offices in Calcutta and Montreal respectively.

Thomas Morson and Son, Ltd., 47, GRAY'S INN ROAD, LONDON (**stand B.78**), will exhibit a selection of fine chemicals used for pharmaceutical, laboratory, technical and toilet purposes. A special feature is made of lithium salts and Morson's soluble kreosote, prepared from certain fractions of beechwood kreosote and existing in the form of a light brown powder, free from smell and soluble in water. This is a natural product, containing 50 per cent. by weight of kreosol and guaiacol oils and may be used to advantage in the preparation of many specialities.

The South Metropolitan Gas Co., 709, OLD KENT ROAD, LONDON (**stands B.52 and 53**), will have a display of Metro chemical products comprising a large range of inorganic and organic compounds, resulting from the manufacture and purification of coal gas and the distillation of crude coal tar. Among them will be an emulsion of a selected "high boiling" tar oil prepared from the same oil as that which has produced satisfactory results in the trials on dormant fruit trees conducted by the Long Ashton Research Station.

Spencer Chapman and Messel, Ltd., 36, MARK LANE, LONDON (**stand B.70**), will show well-known acids such as sulphur trioxide, oleum of strengths of 20, 40, 60 and 80 per cent. concentrated sulphuric acid, battery acid, hydrochloric acid and chemically pure nitric acid.

Staniform, Ltd. (**stand B.69**), a new company formed to take over thev arious Staniform specialities, will exhibit this therapeutic agent in the form of a definite chemical substance combining tin and a methyl radicle with idoine. The recognised usefulness of tin in staphylococcic infections with the marked antiseptic power of idoine are combined, and all preparations of Staniform are entirely free from odour.

Thorium, Ltd., 16, CROSS STREET, HATTON GARDEN, LONDON (**stand A.107**), are exhibiting a very comprehensive range of rare earth products, that of greatest importance being thoria produced in the form of thorium nitrate for the incandescent mantle industry. In the production of thorium nitrate from monazite sand, quantities of other rare earth compounds become available for technical purposes. The cheapest of them are the so-called technical cerium compounds, and considerable quantities have been used in the production of pyrophoric alloys, certain varieties of glass and special cored electric-arc carbons. The most important by-product of the thorium industry is mesothorium, a radio-active material largely employed medicinally and in the manufacture of self luminous compounds in place of radium. Another, already prepared in some considerable quantity, is helium.

Thos. Tyrer and Co., Ltd., of the STIRLING CHEMICAL WORKS, STRATFORD, LONDON (**stand A.184**), will show their usual range of chemicals as well as manganese, nickel, and cobalt products for use as paint driers, cadmium sulphide for the rubber industry, with various acids and aluminium stearate. Nickel formate, of which Tyrers are the only British makers, is chiefly used for the deposition of metallic nickel as a hydrogenation catalyst. A great variety of reagent chemicals is shown under the "Sterling" brand in the firm's special glass reagent bottles.

Whiffen and Sons, Ltd., CARNWATH ROAD, FULHAM, LONDON (**stand B.80**), are exhibiting in its purest form potassium iodide, a speciality of the firm for nearly 100 years. Potassium, ammonium and sodium bromide, of which they claim to be the largest makers in the United Kingdom, are also shown and another interesting exhibit is the emetine group, comprising hypodermic tablets in various sizes. A recent addition to the firm's activities is exhibited in the form of the new health food "Gelozone," a preparation of Carragheen (Chrondrus Crispus).

Williams (Hounslow), Ltd., HOUNSLOW, MIDDLESEX (**stands B.36 and 37**), besides their aniline dyes, having a vast number of applications, examples of dyed material and harmless colours for all classes of confectionery, are also showing two new ranges they have lately produced. Their Cellacquer dyes in powder form are directly and completely soluble in cellulose lacquer and can be supplied in any shade. Spirisol dyes, also in powder form, were produced to meet the demand for dyes soluble in methylated spirit and insoluble in water. They can be supplied in all shades and are claimed to be much stronger than anything for this purpose previously placed upon the market. Being waterproof they have a great value for the paper bag printing industry.

The Birmingham Section

Chemical and Metallurgical Exhibits

The following are notes on some of the exhibits of chemical and metallurgical interest at the Birmingham section of the Fair :—

Allen-Liversidge, Ltd., Victoria Station House, Westminster, S.W.1 (**stand 14 J/1**), are displaying a full range of oxyacetylene, electric arc, and electric resistance welding equipment. The oxy-acetylene plant shown includes high pressure welding outfits which employ dissolved acetylene in cylinders as well as the compressed oxygen ; and low pressure plant for which the acetylene supply is drawn from a generator. In recent years, welding has more and more come to be considered not merely as a useful repairing process, but also as a valuable production process, and many of these outfits have been bought for regular production work. Remarkable metal cutting results can of course be obtained with oxy-acetylene outfits, and 1 in. mild steel plate can be cut at a speed of about 40 ft. per hour with an oxygen consumption of about 88 c. ft. per hour, the acetylene consumption being considerably less. By attaching a suitable fitment carrying a burner and reflector to a cylinder of dissolved acetylene, a powerful storm-proof flarelight is formed providing a candle power of from 1,000 to 15,000 according to size. Examples will also be shown of "Pontelec" resistance welding machines (manufactured by Buckley, Saunders and Co., Ltd., in Birmingham) for which Allen-Liversidge, Ltd., are sole selling agents. They are employed mainly for repetition work, usually, but not necessarily, on light sections of metal.

Bakelite, Ltd., 68, Victoria Street, London, S.W.1 (**stand 19 L/2**), have a comprehensive display showing applications of all Bakelite products in many industries, and their stand will embody Bakelite laminated panels with wood-grain finishes for the walls. For the first time mouldings made from the new Bakelite white moulding material will be on view, and there will also be a special display of large mouldings. Bakelite laminated sheets, insulating varnishes, lacquers, etc., will be shown illustrating different industrial applications.

Beecroft and Partners, Ltd., Retort Works, Sheffield (**stand 19 E./5**), will draw particular attention to their various core binders, fluxes and other foundry materials, such as plumbagoes, parting powders, silica flour, and ferra flakes. The core binders will include an entirely new product marketed under the name of Corbeerite Double Bond, and capable of being used with any sand. A portion of the stand will be devoted to the firm's analytical department, which is in the hands of certified chemists and metallurgists. Laboratory products of interest to foundry and steel works chemists will include Carbest combustion boats, tubes, absorption bulbs, and pocket microscopes.

W. Canning and Co., Ltd., 133, Great Hampton Street, Birmingham (**stand 17 K/1**), have a display of more than usual interest, owing to the great advance which has taken place during the past year in the perfecting and extension of chrome-plating. Besides examples of chrome-plated articles a warm nickel vat complete with rotary air pump for agitating and filtering the warm nickel solutions, and oval depassive anodes, will be shown. In the polishing and metal finishing department considerable progress has been made, and full details will be available. Automatic machines for polishing have been designed which show a reduction of 50 per cent. in production costs. A range of "Canning" low voltage dynamos and motor generators especially designed for electro-deposition are also on view, together with plating barrels, a lacquer spraying cabinet, and a large collection of plating, polishing and finishing materials, embracing chemicals, compositions, brushes, wheels, bobs, felts, mops, and bronzing and lacquering supplies.

The Electric Furnace Co., Ltd., and its newly-formed subsidiary company, **The Electric Resistance Co., Ltd.**, both of 17, Victoria Street, London, S.W.1, are jointly exhibiting at **stand 20 M/4.** The types of furnace which they construct are generally of far too large a size for it to be possible to show them in operation at an exhibition, and consequently their principal furnaces are shown by means of photographs of installations, drawings, etc. They are exhibiting in operation a small Ajax-Northrup high frequency furnace suitable for use in laboratories and illustrating the principle of high frequency melting. A new type of poking machine, used for stirring brass swarf in Ajax-Wyatt furnaces will also be seen. It is claimed that this machine greatly reduces labour costs, reduces the power consumption, and increases the number of heats produced in a given time by over 20 per cent. Drawings and photographs are shown of installations of Heroult, Ajax-Wyatt and Ajax-Northrup furnaces. The Electric Resistance Furnace Co. is showing a melting pot heated by electric resistors, for metals of low-melting point, an air heater, and a number of electric furnace products.

G. A. Harvey and Co. (London), Ltd., Woolwich Road, London, S.E.7 (**stand 8 K/3**), are showing an array of perforated metals and woven wire in a wide variety of patterns and metals. The selections will give some idea of the innumerable industrial purposes served by these two kinds of metal-work, which are extensively used for the screening, grading, cleaning, sifting, separating or filtering of a vast number of commodities from coal, coke and ore, to sugar, fruit juices and fine chemicals. Steel furniture and equipment for offices, works, factories and warehouses forms another part of their exhibit. Among many diverse forms of industrial equipment the firm produces storage vessels, stills, condensers, cylinders, etc., for ammonia recovery, benzole, chemical and creosoting plants, water softening plant, storage tanks up to 116 ft. diameter, hydraulic pressings, tar still bottoms, angle section rings, vulcanising pans, bunkers and structural steel work of all kinds. A header of gilled tubes for transformer tanks exhibited will be of especial interest to electrical engineers.

Monel-Weir, Ltd., Cathcart, Glasgow (**stand 13 F/1**), are exhibiting a striking epitome of the range and diversity of applications of Monel metal and pure malleable nickel. A new alloy is being shown, marketed under the name "Nickel-Chromium-Iron." This alloy is resistant to nitric acid and the mixed acids used in nitration processes, and may be described as a super stainless steel, in that it combines the advantages of the earlier stainless steels with definitely enhanced corrosion resistance, and considerably greater ease of fabrication. Nimol, a new cast iron alloy, containing about 20 per cent. Monel metal, possesses pronounced resistance to heat oxidation up to 600° C., and is free from the destructive growth which characterises normal cast iron. Examples of the application of Monel metal to the chemical industries include a centrifugal basket widely used for drying neutral sulphate of ammonia, and giving ten times the life previously obtained from copper baskets. Solid drawn tubes in a wide variety of sizes and a pickling crate are also on view.

Nobel Chemical Finishes, Ltd., and the **Fredk. Crane Chemical Co.**, both associated companies of Imperial Chemical Industries, Ltd. (**stand 9 K/1**), are showing finishes of all kinds, including cellulose lacquers and enamels, clear and coloured, for application by brush, spray or dip, and a large number of oil paints, stoving enamels and fancy finishes. Particularly artistic is that for hair brush handles, pen sticks and other small articles obtained by what is known as the "Marking process." Another type of finish giving a distinctive appearance to art metal ware, is obtained with Necol cracking enamel. This process consists of applying first a ground coat of one colour and then over this a coat of contrasting colour. The second coat shrinks as it dries and draws away like ink on greasy paper to reveal below the ground colour. "Cranco" cellulose enamels are shown applied to pottery, glass and metal articles, and other attractive finishes are obtained with Crane's cracking, crystalline and crinkle enamels.

Ruston and Hornsby, Ltd., Lincoln (**stand 15J/1**), give pride of place to the first engine sent out from the famous Hornsby Works at Grantham, and there will also be seen running a 9½ b.h.p. Hornsby engine which has been in constant service since 1892. Beside these two veterans will be modern engines by the same builders, including a 10 b.h.p. petrol paraffin engine, a cold starting airless injection type of oil engine and a 3-cylinder vertical engine. Visitors to the Fair who require compressed air for any purpose will be interested in the air compressor which is run primarily for the purpose of providing the means for starting up these oil engines and is capable of giving a maximum air pressure of 300 lbs. per square inch. Another special exhibit is a "Ruston" crude

oil road roller, for which many advantages are claimed over the conventional steam roller.

Stewarts and Lloyds, Ltd., 41, Oswald Street, Glasgow (**stand 14E/2**), are showing a comprehensive selection from their wide range of tubes and joints, together with samples of steel plates, steel sections, and steel castings. Steel coils are exhibited in a sufficient variety of types and sizes to demonstrate the firm's ability to supply any kind of steel coil likely to be required. A feature is made of steel tubes with a lining of bituminous composition, which is unaffected by the softest and most corrosive water. Tubes lined internally with tin, copper and lead are also exhibited, and the first two metals can be applied as an external sheathing if desired. Such composite tubes have the strength of steel with the surface properties of the covering metal. A large section of the stand is devoted to tubes and fittings with Victaulic joints, which combine angular flexibility with automatic leaktightness under either pressure or vacuum.

The United Steel Companies, Ltd., 17, Westbourne Road, Sheffield (**stand 19G/8**), will be showing a very extensive range of steel manufactures drawn from four of their constituent companies. Samuel Fox and Co., Ltd., will display alloy steels, billets, bars, road vehicle springs, cold drawn wire, cold rolled strip, all qualities, including stainless. Cold drawn steel wire for hosiery needles and all textile purposes, razor blade steel, watch, clock, and gramophone spring steel, wire for gramophone pins, and pen steel, etc. Daniel Doncaster and Sons, Ltd., will have alloy steels, drop stampings, valves, die blocks, motor car and aircraft parts; Steel, Peech and Tozer, Ltd., alloy steels for rolling and forging, free cutting steel, bars, blooms and billets; United Strip and Bar Mills, Ltd., hot rolled steel strip, deep stamping steels, steel strip for electric conduit and flexible tubes, ferro-concrete bars, bolt and nut bars, and bright drawing bars, etc.

Some other Exhibitors

Among other firms which will be exhibiting at Birmingham are the British Oxygen Co., Ltd., London; British Road Tar Association, London; Cambridge Instrument Co., Ltd., London; Cannon Iron Foundries, Ltd., Bilston, Staffs; Cassell Cyanide Co., Ltd., Glasgow; Cellon, Ltd., Kingston-on-Thames; Chemical Engineering and Wiltons Patent Furnace Co., Ltd., Chloride Electrical Storage Co., Ltd., Clifton Junction, near Manchester; County Chemical Co., Ltd., Birmingham; T. Firth and Sons, Sheffield; Foster Instrument Co., Letchworth, Herts; Hadfields, Ltd., Sheffield; Illingworth Carbonisation Co., Ltd., Bradford; Imperial Chemical Industries, Ltd., London; Industrial Research Laboratories, Birmingham; London Aluminium Co., Ltd., Birmingham; Metalline Products, Ltd., Birmingham; Metals Coating Co., Ltd., London; Mond Nickel Co., Ltd., London; Silicate Paint Co., Ltd., London; Sturtevant Engineering Co., Ltd., London; Submerged Combustion, Ltd., London.

Chemical and Metallurgical Corporation

Writs Issued By and Against Company

Mr. Stanley C. Smith, M.Sc., in a circular dated, 76, Finsbury Pavement, E.C., February 6, to the shareholders of the Chemical and Metallurgical Corporation, Ltd., says:—

"I think it is my duty to the shareholders to inform them that the board of the company on Tuesday terminated forthwith my appointment as deputy chairman, managing director and general manager. I propose to take the opportunity of explaining the circumstances which have led to this termination at a meeting of the shareholders of the company to be called for an early date. Meantime, I ask the shareholders to suspend their judgment as to the reasons for such termination, and not to sign any proxies or take any action until they have heard the facts from both sides."

A further development this week has been the issue to the Press of a letter from Mr. Stanley Smith's solicitors indicating that the company had issued a writ against him for damages, and that Mr. Smith's solicitors had issued writs against the company and his co-directors for various causes of action.

The directors besides Mr. Smith were Dr. E. P. Andreae (chairman), Mr. F. Arnatt (joint managing), Mr. J. A. Agnew, Mr. R. Annan, Mr. F. W. Baker, Lord Brabourne, Mr. H. Guedalla, and Mr. J. G. Lawn.

Submerged Combustion

Some Notes on the Hammond System

Mr. E. Featherstone Hammond presented a paper on "Submerged Combustion" before the Institute of Fuel, at a meeting held at the Chemical Society's Rooms, Burlington House, London, on Wednesday evening, Dr. F. A. Freeth F.R.S. in the chair.

What "Submerged Combustion" Is

Submerged combustion, as the name implies, is a method of heating by direct contact of the flame from a burner which projects the white hot gases of the flame directly into, and at any depth below the surface of, a fluid or liquid substance such as water, oil, tar, or substances which are solid at normal temperature, but which may be rendered liquid by the application of heat, such as paraffin wax, pitch, lead, tin, zinc and other white metals. For such a method to be successful it is necessary to speed up the chemical combination of the fuel with the necessary air for combustion so that it takes place too fast for any quenching action to become effective.

In the Hammond system, introduced by the author of the paper, a supply of fuel is provided with the whole of the necessary air in the chemically correct proportions, and these are introduced into a mixing appliance constructed of laminations with a special form of piercing, so that when they are built together and secured by rivets, the large and medium sizes holed form tubes from which ducts lead the gas and air into the mixing chamber formed by a large central hole. From this the gas and air emerge in the form of jets, and the cross-sectional areas of the passages are such that these streams or jets are of approximately equal velocity, and have, therefore, no superior kinetic energy either in the gas or air streams. These streams readily diffuse into one another in the mixing chamber to form a perfect homogeneous mixture of uniform composition, and with this perfect mixture it is found that the rate of combustion achieved in the combustion chamber of the burner is 200 times that obtained in the combustion chamber of a high duty boiler under forced draught. The flame generated in the above way is sufficiently stable to be unquenchable.

Advantages

One of the chief advantages which the author claims for submerged combustion is that the area required for the establishment of complete temperature equilibrium is provided by the flame itself, by the manner in which the combustion gases are dispersed, within the substance being heated. In the application of the system to the heating of water for hot-water radiators, the installation is placed at the top of the building, economy being gained thereby.

With the aid of submerged combustion it is now possible to concentrate or otherwise heat-treat highly corrosive liquors in completely corrosion-resisting all-stoneware apparatus, and this method eliminates the hitherto apparently insuperable difficulty of heating liquids effectively in stoneware containers; the heat in the Hammond system being evolved directly in the liquid itself.

It has been found that in the application of the submerged flame to evaporation of chemical solutions the operation of Dalton's Law gives conditions equivalent to evaporation under partial vacuum, and liquors containing substances which readily dissociate at normal boiling point may be handled with safety.

One application of considerable interest lies in the preparation of "stand" oil, in which process ordinary linseed oil is polymerised by being held at a temperature in the neighbourhood of 300° C., and ready control of this temperature is essential. The Hammond burner operates directly submerged in the oil, and not only does the burner function perfectly under these trying conditions, but the oil produced is bright and clear, while the method shows a fuel cost less than one quarter of that usual in normal external firing practice.

The process has also been applied to dyeing and kindred processes, and it has been found in practice that equal tinctorial results can be obtained, with better penetration, working at 180° F. with the Hammond process, than working at 212° F. with consequent danger of shrinking wool fibres under orthodox practice. Obviously, this feature of working at lower temperature is of added value in connection with dyeing certain classes of artificial silks.

Research as a Conceit

To the Editor of THE CHEMICAL AGE.

SIR,—Chemists are amusing people but they might cultivate the sense of proportion a little more than they do. Mr. Rhodes should take them in hand from this point of view and see that they put a little humour into their applications; they would then perhaps stand a better chance with employers. Also, they would not worry "to bring the fundamental ideas concerning themselves and their place in the community" before the public. They would leave actions to speak for themselves. They would behave more as men, with less conceit of *research* and tommy-rotics generally. We have no need to *discuss* the place and function of the chemist in the country but be modest enough to do something worthy of notice by our neighbours. In the medical profession etiquette forbids all self advertisement; why should chemists seek to place themselves upon a lower level? We have yet to be counted worthy of our hire as writers.

In our conceit, we are showing ourselves worse steeped in vanity than any set of artists. Our function is to be truthful; that is our career; therefore, we should not exaggerate even our own merits. Let us show what cures we can effect—by actually curing; if our chores be well done, sufficient advertisement will follow of itself. I recommend the anecdote told by Sir Alfred Erving, reported in *The Listener* (January 29), of a speech he made, as chairman, at a luncheon in Edinburgh, given to welcome the Imperial Conference of Research Workers in Agriculture. He thought he was making quite a nice speech, until he overheard a distinguished guest whisper: "May I never hear the word *research* again as long as I live!" This is fast becoming the public opinion.

Let us leave it to the ladies who have never done any and never will to talk of its lure. The one thing for chemists to do is to throw aside all pretence of "research" and devote themselves to plain, straightforward, truthful study and reasoned inquiry. Chemists have to show that they may be trusted to act and think for themselves and so render efficient service in private practice—rather than let-on in public.

What is *re*-search anyway? Search is a good old English word, which everyone knows and can understand. Put *re* in front of it, the public interest is lost—it not only ceases to have any clear meaning but becomes a mystery and its devotees a class apart, shock-head'd Peters! To most chemists in works it means just analysis; to biochemistresses mainly feeding guinea pigs—mostly misfeeding; to colloid chemists, froth blowing.

Let there be more searchings of heart and less talk of our status.—Yours, etc.,

HENRY E. ARMSTRONG.

"Chemistry and War"

To the Editor of THE CHEMICAL AGE.

SIR,—I write to express my appreciation of your editorial, "Chemistry and War" in the current issue of THE CHEMICAL AGE—a comment all the more welcome after reading on the previous day the editorial of *The Chemical Trade Journal* with its pre-war mentality and cheap jibe at the League of Nations.

So far as my own experience goes, I am convinced that you are right in asserting that a fatalistic war mind is not characteristic of chemists or other scientific workers.

It is a difficult task at best to convince a layman of the impracticability of genuine chemical disarmament and Dr. Levinstein will need all the support that chemists generally can give him if his message is to be effective. Technical chemists who assert that the abolition of chemical warfare is an illusion and urge that energy and time wasted to that end would be better spent in furthering efforts towards general disarmament and in improving the machinery for settling international disputes are commonly ignored or regarded as the foes to disarmament.

That task would become impossible if a few "scientists" with a prehistoric mentality cause the community to associate chemists and chemistry with similar obsolete and fatalistic views on peace and war. Modern science has so enhanced the extent and destructiveness of warfare that civilisation can only survive by finding other means of settling its international disputes. The co-operation of scientific men in evolving such methods is urgently required, for only through them can the community regain control over events.

What is needed is the development of a science of peace—the application to international affairs of those rational processes and habits of co-operation by which science has itself advanced. The responsibility of leadership lies largely on science. Hers is the task of educating the community, of pointing out the dangers and fallacies in the present situation, obvious to the scientist, but not to others, as Dr. Levinstein has done in his lecture. Equally, if not more important, is that positive contribution which the community has a right to expect of science—instruction how to turn to constructive ends the forces and knowledge which science has released.—Yours, etc.,

R. BRIGHTMAN.

Crumpsall.

February 11.

Beet Sugar Factories and River Pollution

To the Editor of THE CHEMICAL AGE.

SIR,—During the past three months the Press has contained a deplorable number of reports of serious pollutions of rivers, in many cases accompanied by the destruction of immense quantities of fish. Most of these have occurred below beet sugar factories and at just that period of the year when the beet is being received at the factories and converted. How great has been the injury may be illustrated by a few examples:

River Witham.—Thirty miles of river polluted. Loss of fish estimated at hundreds of tons. Stench from the river described as "unendurable," so that men in mills and on works on the banks could not continue at work. Scum and froth reported to float on the edges of the stream eighteen inches to two feet deep. Great anxiety is felt that the valuable shell fisheries at the river mouth near Boston will be destroyed.

Rivers Ouse and *Wissey.*—Great destruction of fish reported. The decaying fish are stated by the Medical Officer to be polluting the local water supplies, which are dependent on the river. In many cases inhabitants and their cattle had to drink water which stank and was dangerous to health. Fears were expressed that an epidemic might break out.

River Nene.—Vast quantities of fish in the river reported destroyed and rotting. Peterborough Corporation collected and destroyed several cart loads, and the Fishery Board stated it would take twenty years to replace the loss. The bathing place had to be closed.

The beet sugar industry is being fostered by the Ministry of Agriculture and Fisheries and has already received over £14,000,000 of the taxpayers' money in subsidies. Before the industry was set up the nature of the effluents from the processes to be adopted was known, or readily ascertainable, and the pollution was remediable. Yet, despite the fact that the Ministry is also charged with the care of our fisheries, the factories were in most cases placed on non-tidal waters containing fisheries, where the pollution was likely to have the worst possible results; moreover, other processes of beet production which do not produce these immense quantities of poisonous effluent are known and in successful operation.

The Pure Rivers Society, which represents also all interests concerned in the purity of our rivers and inshore waters, is engaged on the drafting of a Bill to be introduced into Parliament dealing with these and other necessary amendments in the law. It appeals for help and co-operation in a campaign which is essential if our rivers are to be saved.—Yours, etc.,

THOS. W. GOMM

(Hon. Secretary, Pure Rivers Society).

London, February 8.

German Chemical Fertiliser Consumption

REVISED figures indicate a consumption by German farmers in 1928–29 of 430,000 metric tons nitrogen, 547,000 tons phosphorus pentoxide, and 783,000 tons pure potash, an increased consumption over 1927–28 of 40,000 tons nitrogen, or 10 per cent.; 39,000 tons P_2O_5, or 7 per cent., and 50,000 tons K_2O, or 7 per cent. Ammonium sulphate consumption was reported to have diminished during 1928–29. Increases in consumption, however, affected the other fertiliser nitrogen carriers, notably nitrophoska.

Progress of Scientific and Industrial Research

Industry Slow to take Advantage of Results

We give below some extracts from the annual report for the year 1928–29 of the Department of Scientific and Industrial Research. (H.M. Stationery Office, pp. 200, 3s. 6d.) It will be seen that while satisfaction is expressed with the general progress of research in this country, some doubt is expressed whether industry is alive to the importance of making commercial use of the results.

Fuel Research Problems

DURING the year the low temperature carbonisation plant at Richmond, erected by the Gas Light and Coke Co. on designs developed at the Fuel Research Station, has been started up and is now operating satisfactorily. In the meantime work has been continued at the Fuel Research Station on the single retorts, with the object of developing a form of retort which will have as long a life as possible, and of determining the most appropriate types of coals and blends of coals for carbonisation at low temperatures. It is interesting to note that the experimental retorts which were constructed to the design of the British Cast Iron Research Association and made of special material recommended by that Association, have shown no sign of distortion after fourteen months' continuous operation. This is a most satisfactory result, since the commercial success of this plant will probably rest very largely on the life of the retorts. No other retort yet tested at the Station has had so long a life without measurable and even serious distortion.

Various low temperature research plants besides that at Richmond are now working under conditions and on a scale that should enable definite conclusions to be drawn within a few years as to the extent of their commercial success and the probable scale on which they can be profitably worked. Extravagant optimism based on insufficient data seems at last to have been almost entirely replaced by a keen desire to ascertain the facts by properly controlled industrial experiments.

Priority for Carbonisation Problems

There were two main reasons, when the Board started its work, for giving a high degree of priority to all problems of carbonisation. The Board now advises that the time has come when priority shall no longer be given to the problems of carbonisation which are of special interest to the gas industry, although they consider that the programme on horizontal retorts should be completed without any attempt to limit its scope. It is proposed that the work should now be developed in other directions. One of these is a general investigation of furnace design with particular reference to the burning of pulverised fuel. The chief technical problem here is to secure complete combustion in a small space. The successful use of pulverised fuel has been dependent, up to the present, upon the provision of excessively large combustion spaces, for which there does not seem to be any basic necessity. This is a serious handicap when it is desired to apply the system to ships, where conservation of space is of so much importance. Preliminary experiments appear to indicate that combustion space can be very largely cut down without practical disadvantages, and intensive work will be undertaken in this direction. The main problem to be solved is how to make a small particle of coal burn as quickly as possible. The complete examination of this problem will involve physical research of great interest and possibly of great difficulty.

Metallurgical Coke

The Board is also exploring in detail the possibility of making extensive investigations on the production of metallurgical coke. This is a problem of carbonisation which has not been studied with anything like the care and detail it deserves. At present metallurgical coke is only obtainable from certain types of coal, and although plentiful supplies of such coal occur in some of the British coalfields, it is of primary importance to the coal industry to extend the area of supply as much as possible. There are indications that satisfactory coke can be made from coals and blends of coals which are at present considered unsuitable, but systematic investigation will be necessary to secure this result. Accurate information is also needed on the type of coke oven and of treatment which will secure the best results from the coals now used.

It is also proposed to complete a detailed investigation into the manufacture of water gas, which is of importance not only to the gas industry, but to many branches of the chemical and other industries. Dr. Morris Travers, F.R.S., a member of the Board, has paid a great deal of attention to the scientific aspects of the manufacture of water gas, and is closely associated with the large scale experiments being carried out at the Station.

The Bergius Process

An investigation was started some years ago into the Bergius process for the hydrogenation of coal. This consists in treating the coal with hydrogen at high temperatures and pressures, and the result is, when using suitable coals, to convert some 60 per cent. or more of the coal substance into distillable oil. The technical possibility of the process has been proved, and its commercial possibilities and those of its modifications are being explored by industry.

A plant designed for continuous working and capable of treating one ton of coal a day is in operation at the Fuel Research Station, and is being used for investigating the reactions that take place, and the conditions necessary to promote them. It has been found that a very small addition of hydrogen to the coal may have a profound effect on the whole coal substance, and will, for example, convert a non-caking coal into a substance possessing stronger caking power than the most strongly coking coal known. The process is now being studied, using coal with the lowest content of inorganic matter that can be obtained or prepared, and this will be followed by the addition of inorganic substances so as to ascertain what effect, if any, is produced by the various inorganic substances contained in the "ash" of coals. The investigation promises to throw much light on the constitution of the coal substance, and the manner in which it is broken down by various methods of treatment. The apparatus is also in use for the treatment of tars produced by low temperature carbonisation.

These will be the chief items of full-scale investigations at the Fuel Research Station during the next few years.

Low Temperature Tars

The chemical composition of the tar obtained by the carbonisation of coal at high temperature has been studied intensively for nearly a century in all industrialised countries. It has proved to be a plentiful source of aromatic compounds, including the hydrocarbons benzene, toluene, naphthalene and anthracene, and the tar acids carbolic and cresylic acids. All these compounds have acquired considerable industrial importance as starting materials in the manufacture of synthetic dyes and drugs, high explosives, photographic and many other useful products.

The tar obtained by the carbonisation of coal at low temperatures differs very considerably in composition from high temperature tar, and has received comparatively little attention from the point of view of its possible uses in the chemical industry. In 1925 it was therefore decided that the Chemical Research Laboratory at Teddington should undertake, in collaboration with the Fuel Research Station, an exhaustive research on the chemical constituents of low temperature tar obtained from standard coals carbonised under accurately controlled conditions. The Director of Chemical Research, Dr. G. T. Morgan, F.R.S., gave a full account of the work at a recent meeting of the Society of Chemical Industry, and the interest aroused by his lecture gives us reason to hope for early practical application of some of the results of the investigations.

It has been shown that the main differences between low temperature tar and high temperature tar are that the former contain a much smaller proportion of aromatic hydrocarbons, but a much larger proportion of phenolic compounds, resins and waxes. The phenolic compounds can be separated in a

form suitable for use in the manufacture of synthetic resins, germicides, disinfectants and wood preservatives. All these products are in large and growing demand. The aqueous liquors associated with the tar also contain relatively large quantities of phenols, including catechol, which is an important synthetic reagent. If available in quantity from the products of low temperature carbonisation, its use in the production of drugs, dyes and photographic materials should become more general.

It has also been shown that there are large amounts of different types of resinous materials present in low temperature tar. As the temperature of carbonisation is increased, these resins tend to disappear and to become replaced by ill-defined and intractable solids. The existence of the resins in low temperature tar is of considerable scientific interest, and as they are easily separable in a state of sufficient purity, they should be capable of extensive industrial application. When dissolved in appropriate solvents and applied to wood surfaces, they make excellent lacquers, stains and varnishes. They can be used also as protective films for metal, and can be fashioned into moulded articles when mixed with suitable fillers. The darker resins can be used as components of printer's ink, and even in their crudest forms the resins can be employed for briquetting and similar purposes.

Waste Waters from Beet Sugar Works

Experiments commenced in 1927 on the purification of the waste waters from beet sugar factories by the process of biological oxidation on percolating filters, were continued during the 1928-29 sugar-beet campaign. The investigation has included experiments in the laboratory and on a semi-commercial scale. During the 1927-1928 campaign, under the conditions employed, a purification of 70 to 80 per cent. was obtained, and this was improved to 90 per cent. purification in the semi-commercial scale experiments carried out in the following year. This amount of purification was obtained when treating pulp-press liquor diluted with flume water. Before admixture with pulp-press liquor, the flume water had been subjected to partial settlement, but it still contained suspended matter which was largely deposited in the filters. The filters showed signs of " ponding " at the end of the 1928-29 campaign, which lasted only 69 days. With a longer campaign it is probable that the deposition of solid matter in the filters would have been sufficient to put them out of action. In view of the promising results which have been obtained, we have approved the recommendations of the Board that the investigation should be continued during the 1929–1930 campaign with the object of ascertaining what further improvement in the process can be made.

Grants for Scientific Work

The grants to the Royal Institution for the assistance of Sir William Bragg's work on X-rays ; to the Imperial College of Science in aid of Professor Bone's work on high pressure reactions ; and to the Cavendish Laboratory, Cambridge, in aid of Dr. Kapitza's magnetic researches, have been continued.

Dr. Kapitza's important investigations on the properties of the elements in strong magnetic fields at the temperature of liquid air have reached the point where experiments at still lower temperatures are desirable. The University Committee which administers this grant advised us that a plant for the provision of liquid hydrogen could be erected at a total cost of £1,500. In view of the outstanding character of the work, and also of the circumstance that, so far as we know, no apparatus for the production of liquid hydrogen exists in this country, we recommend that the Department should make this further grant. If the scheme is successful, it may be desirable to extend it still further later on by the addition of plant for the production of liquid helium.

Chemistry of Oils and Fats

Among other grants that have been made may be mentioned those for the encouragement of work on the chemistry of oils and fats. For this purpose assistance is being given to Dr. Smedley Maclean, whose investigations of the formation of fats by yeast are of considerable interest ; to Professor Heilbron, who is engaged, with his collaborators, on a general investigation of the chemistry of sterols, and of the unsaponifiable matter of vegetable and marine animal oils ; and to Professor Hilditch, who is working on the constitution of fats, and especially on the nature of the glycerides of fats. A conference was held during the year in order to facilitate an interchange of views between the workers on these allied subjects, and to avoid any unnecessary overlapping of effort.

In our last report we referred to the co-operation of the Department with the Chemotherapy Committee of the Medical Research Council. The Department has three representatives on the Committee, and provides the funds necessary for chemical researches having as their aim the production of new substances of therapeutical value. The importance of this work is unquestioned, and we are anxious that it should be supported as strongly as possible. On the application of the Committee we recommended that the grant for researches at Universities under their direction should be increased this year from £2,000 to £3,000 per annum. Professor Morgan is also carrying out work for the Committee at the Chemical Research Laboratory, Teddington.

Industrialists Lagging Behind Science

During the past two years we made it our business to visit the headquarters and laboratories of the research associations. These visits have been of great value in enabling us to gain further insight into, and first hand information of, the work being done by research associations. While greatly stimulated by all we saw, we were also left with some feeling of disappointment that the results achieved were not being applied and utilised by the industries to a greater extent or with the enthusiasm that their merits often justified. There is still too big a gap between the completion of a successful investigation and the application of its results in practice. We agree with the Balfour Committee on Industry and Trade that the associations must do their part in bridging this gap even at the expense of slowing down their programme of research. They need to keep prominently in mind the necessity of presenting their results in a manner which can be readily understood and appreciated by manufacturers. Many associations are already taking steps to develop and demonstrate their work on a large scale. We think this is a wise policy ; but it costs money and impels us to emphasise again that the full worth of co-operative research associations, as indeed of all organisations for industrial research, can only be realised if they are adequately financed.

The general attitude of British industry in this respect is, we are glad to think, gradually broadening under the influence of its more enlightened sections. We were recently informed, for example, that the powerful Tin Producers Association, which has just been formed, has made the encouragement of scientific research on tin and its alloys one of its main objectives. This follows on the programme of work which has already been put in hand for this section of the industry by the British Non-Ferrous Metals Research Association. We hope that this important move is only a prelude to further similar developments. The British Empire is rich in minerals, many of which have received little or no attention from the industrial point of view. Powerful British companies control the output of other minerals from foreign countries.

Industrial Uses of New Metals and Alloys

Of all countries, Great Britain ought to take the lead in the investigation of the industrial uses of new metals and alloys, yet we seem too content to allow such developments to take place in foreign countries. To take a concrete example, the alloys of magnesium have been intensively investigated in Germany for some years, and they are now produced and used on a large scale. Inquiries we set on foot showed that although these alloys were being made *under licence* in this country, no industrial research was taking place or was likely to take place. In view of the special importance of light alloys to the aircraft industry, and therefore to the Air Ministry, we accepted a recommendation of the Metallurgy Research Board that a general research on magnesium and its alloys should be started at the National Physical Laboratory. We do not, however, hide from ourselves the conviction that the results of such an investigation, however interesting, will be of doubtful practical value to British industry unless they are linked up with production through investigations on an industrial scale and under industrial conditions.

British Chemical Overseas Trade for January

Substantial Drop in Imports

A DECREASE in all three sections, imports, exports and re-exports of chemicals, drugs, dyes and colours is shown by the Board of Trade Returns for January. It is somewhat reassuring, however, to find that the drop in imports—which at £1,259,061 are £274,127 less than the figures for January, 1929—is nearly five times the decrease in exports, which at £2,172,831, are down by £57,431. Re-exports show a decrease of only £62.

Imports

	Quantities Month ended January 31, 1929.	Quantities Month ended January 31, 1930.	Value Month ended January 31, 1929. £	Value Month ended January 31, 1930. £
CHEMICAL MANUFACTURES AND PRODUCTS—				
Acetic Anhydride ..cwt.	667	60	29,273	182
Acid Acetic .....tons		1,496		58,524
Acid Tartaric .....cwt	2,918	2,653	19,598	18,025
Bleaching Materials ,,	17,054	13,210	14,704	13,230
Borax ..... ,,	7,801	24,600	6,415	15,079
Calcium Carbide ... ,,	108,688	99,288	65,594	60,586
Coal Tar Products, not elsewhere specified value	—	—	6,221	8,300
Glycerine, crude ..cwt.	120	984	274	2,117
Glycerine, Distilled ,,	1,132	508	3,054	1,245
Red Lead and Orange Lead.....cwt.	3,907	4,090	5,304	6,881
Nickel Oxide ..... ,,	105	96	593	449
Potassium Nitrate (Saltpetre).. ... ,,	8,990	14,353	9,603	14,285
Other Potassium Compounds .....cwt.	350,124	249,959	98,570	79,205
Sodium Nitrate ... ,,	297,116	142,767	147,104	64,103
Other Sodium Compounds..... ,,	47,665	39,723	35,618	28,071
Tartar, Cream of.. ,,	2,760	3,252	11,466	15,524
Zinc Oxide..... tons	1,248	1,014	37,610	29,411
Other Sorts..... value	—	—	319,540	278,015
DRUGS, MEDICINES, ETC.—				
Quinine and Quinine Salts .....oz.	150,042	138,136	10,806	10,241
Bark Cinchona, etc. cwt.	3,018	2,018	10,848	9,265
Other Sorts..... value	—	—	265,917	164,358
DYES AND DYESTUFFS, ETC—				
Intermediate Coal Tar Products.....cwt.	15	109	198	1,323
Alizarine ..... ,,	90	24	3,132	737
Indigo, Synthetic ,,	—	—	—	—
Other Sorts..... ,,	4,053	4,063	96,748	108,905
Cutch ..... ,,	4,418	2,895	7,071	4,999
Other Dyeing Extracts cwt.	2,199	3,673	7,758	12,823
Indigo, Natural.... ,,	71	11	1,895	250
Extracts for Tanning ,,	90,804	81,205	97,355	78,933
PAINTERS' COLOURS AND MATERIALS—				
Barytes, ground ..cwt.	72,353	49,747	14,313	10,980
White Lead (dry).. ,,	11,791	12,300	19,536	21,610
All other Sorts .... ,,	130,811	98,692	187,004	141,405
Total of Chemicals, Drugs, Dyes, and Colours.....value	—	—	1,533,188	1,259,061

Exports

CHEMICAL MANUFACTURES AND PRODUCTS—				
Acid Sulphuric ....cwt.	9,970	16,035	5,097	5,145
Acid Tartaric ..... ,,	2,483	2,137	17,282	15,454
Ammonium Chloride (Muriate) .....tons	285	389	6,208	6,740
Ammonium Sulphate—				
To Spain and Canaries tons	15,875	29,812	156,969	258,902
,, Italy ..... ,,	620	1,186	5,734	10,792
,, Dutch East Indies tons	3,425	5,241	35,514	48,343
,, China (including Hongkong) tons	7,960	5,121	83,762	47,004
,, Japan .....tons	8,932	10,488	90,151	94,950
,, British West India Islands and British Guiana tons	539	894	5,287	8,038
,, OtherCountries ,,	7,264	13,830	71,241	121,710
Total .....tons	44,915	66,578	448,958	589,739
Bleaching Powder..cwt.	51,240	52,689	15,333	15,277

Re-Exports

	Quantities Month ended January 31 1929.	Quantities Month ended January 31 1930.	Value Month ended January 31 1929. £	Value Month ended January 31 1930. £
COAL TAR PRODUCTS—				
Anthracene .....cwt.	—	5	—	3
Benzol and Toluol galls.	6,012	81,020	602	8,934
Carbolic Acid ....cwt.	22,230	3,454	38,119	6,545
Cresylic Acid .... galls.		138,685		17,568
Naphtha ..... ,,	8,469	2,731	792	436
Naphthalene (excluding Naphthalene Oil).cwt.	8,258	11,848	3,105	3,735
Tar Oil, Creosote Oil, etc. .....galls.	1,598,070	470,627	54,226	12,405
Other Sorts .....cwt.	23,063	34,955	18,193	21,387
Total .....Value	—	—	115,037	71,013
Copper, Sulphate of ..tons	6,450	3,296	154,913	78,452
Disinfectants, Insecticides, etc. .....cwt.	33,809	35,740	84,719	82,725
Glycerine, Crude ..... ,,	1,485	2,798	2,066	6,229
Glycerine, Distilled .. ,,	5,763	7,769	16,238	20,063
Total ..... ,,	7,248	10,567	18,304	26,292
POTASSIUM COMPOUNDS—				
Chromate and Bi-chromate.....cwt.	2,396	631	4,414	1,248
Nitrate (Saltpetre) ,,	1,157	939	2,204	1,817
All other Sorts ... ,,	3,387	3,521	11,186	11,573
Total ..... ,,	6,940	5,091	17,804	14,638
SODIUM COMPOUNDS—				
Carbonate .....cwt.	382,259	376,448	117,110	103,750
Caustic ..... ,,	119,258	191,524	84,037	122,229
Chromate and Bi-chromate.....cwt.	7,061	1,907	9,760	3,057
Sulphate, including Salt Cake .....cwt.	100,237	127,112	10,620	14,805
All other Sorts ... ,,	42,517	58,381	53,037	82,197
Total ..... ,,	651,332	755,372	274,564	326,038
Zinc Oxide .....tons	121	180	4,988	6,348
ChemicalManufactures,etc, all other Sorts ..value	—	—	310,663	291,590
Total of Chemical Manufactures and Products.. value	—	—	1,474,230	1,529,457
DRUGS, MEDICINES, ETC.—				
Quinine and Quinine Salts .....oz.	104,005	138,995	17,149	13,753
All other Sorts ..Value	—	—	283,408	258,928
Total ..... ,,	—	—	300,557	272,681
DYES AND DYESTUFFS—				
Products of Coal Tar cwt.	14,255	7,005	86,733	59,039
Other Sorts..... ,,	10,175	7,556	11,857	7,809
Total ..... ,,	24,430	15,161	98,590	64,448
PAINTERS' COLOURS AND MATERIALS—				
Barytes, ground ...cwt.	119	1,990	42	837
White Lead (dry) .. ,,	4,629	2,225	9,147	4,579
Paints and Colours, in paste form .....cwt.	52,318	39,070	104,541	77,095
Paints and Enamels Prepared .....cwt.	44,034	41,100	141,937	131,090
All other Sorts.... ,,	55,590	48,752	101,218	92,674
Total ..... ,,	157,290	133,137	356,885	306,245
Total of Chemicals, Drugs, Dyes and Colours....value	—	—	2,230,262	2,172,831

Re-Exports

	Quantities Month ended January 31.		Value Month ended January 31.	
CHEMICAL MANUFACTURES AND PRODUCTS—	1929.	1930.	1929.	1930.
Acid Tartaric ....cwt.	73	95	595	740
Borax..... ,,	545	1,057	531	1,571
Coal Tar Products value	—	—	16	19
Potassium Compounds—				
Nitrate (Saltpetre) cwt.	221	2,059	368	1,838
Sodium Nitrate ... ,,	144	229	81	115
Tartar, Cream of .. ,,	550	327	2,639	1,316
All other Sorts...value	—	—	12,079	14,707
DRUGS, MEDICINES, ETC.—				
Quinine and Quinine Salts.....oz.	20,388	14,902	2,187	1,316
Bark Cinchona, etc. cwt.	182	149	764	878
All other Sorts ..value	—	—	34,994	34,804
DYES AND DYESTUFFS—				
Cutch .....cwt.	2,168	970	3,416	1,489
All other Sorts .... ,,	296	127	2,059	1,446
Indigo, Natural .. ,,	3	—	88	—
Extracts for Tanning ..	1,315	762	1,774	1,036
PAINTERS' COLOURS AND MATERIALS.....cwt.	10,803	2,793	4,656	5,048
Total of Chemicals, Drugs, Dyes and Colours			66,596	66,537

Scientist Killed by Explosion

Tragic End of Promising Career

DR. FRANCIS ARNALL, Ph.D., M.Sc., F.I.C., head of the chemistry and industrial chemistry departments of Cardiff Technical College, died in Cardiff Infirmary on Friday, February 7, as the result of injuries received by the explosion of a test tube with which he was working in the college laboratory earlier in the day. Much of the apparatus in the room was wrecked by the force of the explosion and three other chemists, Mr. R. Vernon Lloyd, head of the pharmacy department, Mr. J. D. Jenkins and Miss Eileen Melville, were injured by flying glass.

Dr. Arnall was in charge of experiments which were being carried out to provide research data for the annual conference of the Pharmaceutical Society of Great Britain to be held in Cardiff in July next. At a meeting of Cardiff City Council on Monday a vote of sympathy was passed with his relatives and it was stated that he had met his death on the verge of a discovery which would have brought credit to Cardiff.

The head of the college, Principal Charles Coles, in an interview, stated that Dr. Arnall was a chemist of great experience and had conducted some extremely valuable research work during the two years he had been at Cardiff. He had given his life in the cause of science. "His death," added Principal Coles, "is a great loss to Cardiff, for he was undoubtedly a brilliant chemist."

A native of East Yorkshire, Dr. Arnall was 34 years of age, and leaves a widow and a little girl. He was trained at Chelsea and London University and before his appointment at Cardiff was head of the chemistry department of Chelsea Technical College. During the war he served with the Royal Engineers in Belgium, Gallipoli and on the Italian frontier.

Phosphate Deposits on Nauru Islands

IT has been announced by the resident commissioner for the Gilbert and Ellice Islands groups that the surface of the phosphate deposits on Nauru and Ocean Islands have barely been scratched and that recent improvements in the facilities for storing and shipping will permit the export of about 400,000 tons annually from Ocean Island, and at the contemplated rate of export the supply of phosphate will be adequate for at least a century to come. It is reported that there has been a distinct swing toward autumn top dressing during the last few years, as a result of governmental encouragement, and it is expected that within a few years a large proportion of phosphate dressing will be done in December instead of in May as at present. The chief advantage of December dressing is that it tends to increase production in autumn and winter months, when it is naturally low, whereas May or June dressing increases growth at a season when it is normally good. Seasons in New Zealand are of course the opposite of those in the northern hemisphere.

Indian Chemical Notes

[FROM OUR INDIAN CORRESPONDENT.]

Research on Shellac

THE Indian Lac Association has been carrying out investigations on shellac, and some of the results are now available. It is well known that synthetic resins have made rapid headway in recent years, and bid fair to replace natural shellac in several industries. In these circumstances, systematic studies of the properties of shellac are essential in assisting it to retain its position in industries in which it occupies a prominent place, and in regaining the unique position it has partially or completely lost in others. Of these, the study of the behaviour of different solvents from the point of view of the subsequent properties of the shellac solutions is by no means the least important. In the industries in which shellac is employed in the form of solution, *e.g.*, in the varnish industry, the physical properties of the solvent or the mixture of solvents have no doubt considerable influence.

Mixed Solvents for Shellac

Work was therefore undertaken on mixed solvents, with a view to finding out how the properties of shellac solutions vary with mixtures of different solvents, and also to ascertain if any behaviour would be observed which could then be made use of in practical application. The results of the studies of viscosity and solvent power only are now available, while other properties such as the physical state of shellac in different solvents and the rate of evaporation are still under investigation.

The solvent mixtures that have been taken up for experimental work may be classified under the following three general types :—(1) Alcohols and alcohols ; (2) Alcohols and esters; (3) Alcohols and ketones.

For mixtures of the first type, the following mixed solvents have been taken up for investigation :—methyl and ethyl alcohol, methyl and prophyl alcohol, alcohol and cyclohexanol. In the choice of solvents in the first and second series, the purpose has been to select the commonest alcohols. The importance of including cyclohexanol in the third series has been chiefly to find out the possibility of employing this industrial solvent in conjunction with enough of the more expensive alcohol to reduce the viscosity of the resulting solution to a desirable degree.

Mixtures of the second type mentioned above consist of the following three series :—Ethyl alcohol and ethyl acetate ; ethyl alcohol and amyl acetate ; ethyl alcohol and glyceryl triacetate. The object of including glyceryl triacetate or the commercial triacetin as one of the components in the third series has been to find out the possibilities of employing this.

The third type comprises the following three series of mixtures in which combinations are made of two of the commonest alcohols with the two simplest ketones :—Methyl alcohol and acetone ; ethyl alcohol and acetone ; ethyl alcohol and methyl ethyl ketone. Each series includes, besides the two pure solvents, nine mixtures of varying composition made by mixing the required volumes of the two solvents.

Results Obtained

The results obtained in each series need not be detailed here. Only the general results are noted. A simultaneous consideration of both viscosity and solvent power is important in rating a solvent. If, for instance, mixtures of methyl and ethyl alcohols are considered, though the solution in ethyl alcohol possesses a high solvent power number, the viscosity of the solution is also high compared with the solution in methyl alcohol. But if, instead, a solvent mixture is employed consisting of equal volumes of the two, the resulting solution has a solvent power number as high as that of ethyl alcohol but is only half as viscous as the solution in pure ethyl alcohol.

In the case of mixtures of alcohols and esters, such an advantage is not conspicuous except in the case of ethyl alcohol-ethyl acetate mixtures. Mixtures of alcohols and ketones deserve special attention. As has already been mentioned, though both the ketones cited above are non-solvents for shellac, they show when mixed with ethyl alcohol greater efficiency than pure alcohol. The possibility of employing non-solvents like these in combination with enough of alcohol is therefore evident, and considering the comparatively low price of acetone, the economic advantage of employing such a mixture is obvious.

Society of Public Analysts

The Use of "Internal Electrolysis"

AN ordinary meeting of the Society was held at the Chemical Society's Rooms, Burlington House, London, on Wednesday, February 5, the President (Mr. Edward Hinks) being in the chair.

Certificates were read for the first time in favour of L. M. Adams, J. C. Harral, D. F. H. Button, A.R.C.S., A.I.C., H. Childs, B.Sc., F.I.C., J. W. Corran, B.Sc., Ph.D., F.I.C., A. O. Jones, M.A., F.I.C., J. B. E. Patterson, M.Sc., A.I.C., F. J. Smith, B.Sc., A.I.C., and A. Tingle, B.Sc., Ph.D.; for the second time in favour of R. G. Baskett, B.Sc., H. C. L. Bloxam, F.I.C., C. McClellan Bottomley, B.Sc., J. Butler, B.Sc., F.I.C., R. Ellison, A.M.C.T., G. N. Grinling, F.I.C., A. Houlbrooke, M.Sc., A.I.C., P. H. Jones, F.I.C., R. Mallinder, S. N. H. Stothart, B.Sc., Ph.D., A.I.C. and H. Threadgold, B.Sc., A.I.C.

The following were elected members:—N. L. Allport, A.I.C., J. G. Lunt, B.Sc., A.I.C., F. Morris, F.I.C., A. W. Peters, J. H. Quastel, D.Sc., Ph.D., A.R.C.S., A.I.C., and J. H. Totton, B.A., B.Sc., F.I.C.

Abstracts of Papers

In a paper on "The Determination of Minute Amounts of Iodine in Soils and Waters," by R. L. Andrew, it was pointed out that a modification of Fellenberg's method has been devised, in which special means are taken to free the reagents (alcohol, chloroform and potassium carbonate) from all traces of iodine. The losses occurring at the different stages of the process, which are probably not entirely attributable to overheating, cannot be altogether eliminated. From 60 to 70 per cent. of iodine added to a soil can be recovered. The results obtained by colorimetric methods are shown to be more trustworthy than those obtained by titration. Soils from the North Island of New Zealand contained from 10 to 2,100 parts of iodine in 10 millions, and the drinking waters from 0·004 to 0·120 part per 10 millions.

"Preliminary Studies in the Bacteriology of Wheat and Flour" was the title of a paper by D. W. Kent-Jones, Ph.D., B.Sc., F.I.C. and A. J. Amos, B.Sc., A.I.C. A definite and satisfactory procedure, it was stated, for enumerating bacteria in wheat and flour has been devised. From the data so far collected it appears that freshly and normally milled patent flour contains less than 20,000 blood-heat bacteria, straight run flour less than 50,000, and lower grade flour up to 300,000 per grm. The cool organism content of any grade is nearly always greater than the figure for the blood-heat organisms. Storage of a flour results in a considerable decrease in the number of both forms. Many of the more common flour bacteria have been identified or their cultural and physiological characteristics established. Organisms of the *B. mesentericus* group are almost universally present in flour and bread.

The separation of metals by internal electrolysis was described by H. J. S. Sand, D.Sc., Ph.D., F.I.C. The metal to be determined is deposited on a platinum cathode, the essential feature of the method being that no electric current is introduced from outside, but, instead, an anode of the baser metal is employed, which is placed in contact with a solution of one of its salts in a compartment separated by a parchment membrane from the solution to be examined.

The rapid determination of bismuth and copper in lead bullion by internal electrolysis was described by Ella M. Collin, B.Sc., A.I.C. The method of "internal electrolysis" has been used to separate small quantities of bismuth and copper from large amounts of lead, the less basic metals being displaced from solution by means of lead, without any external E.M.F. In applying the method to the analysis of lead bullion, impurities other than bismuth or copper are either precipitated or are prevented from being deposited.

In some notes on the thiocyanate method of determining iron and the influence of different classes of phosphates, G. Winthrop Leeper, M.Sc. pointed out that orthophosphates do not interfere with the thiocyanate reaction provided that the ratio of phosphoric anhydride to iron does not exceed 100 mgrms. to 0·02 mgrm. It is essential, however, that when extracting the ashed material with acid, sufficient time is allowed for any pyrophosphate formed to be reconverted into orthophosphate. Both pyrophosphates and metaphosphates rapidly destroy the colour of ferric thiocyanate.

The Problem of Flue Gases

A Paper by Dr. Travers

A JOINT meeting of the Manchester Section of the Society of Chemical Industry and the Institute of Fuel was held on Friday, February 7, Mr. C. J. T. Cronshaw presiding. A paper dealing with problems of flue gases was read by Professor M. W. Travers, D.Sc., F.R.S.

A Public Problem

The pollution of the air by the consumption of coal, Dr. Travers said, had troubled those concerned with the amenities of great cities and the health of their inhabitants for something like six centuries. At present the law was exceedingly mild in its treatment of offenders, and it was really common sense more than law which had gone farthest in regard to atmospheric purification. It was now considered that the presence of smoke as well as waste of carbonaceous material indicated that somebody did not know his job. The fact was now, however, being forced upon the attention not only of chemists and engineers but of the public generally that the absence of smoke did not necessarily imply a pure atmosphere, and that dust, oxides of sulphur, and carbon monoxide were also dangerous to health. The danger of the emission of fumes from large power plants was now attracting attention throughout the country, and, according to Dr. Lessing, the solution of a considerable portion of this problem lay in the suitable cleaning of coal. It appeared, also, that greater thought must be given to the question of furnace design and to the treatment of ash; a perfectly ashless fuel would probably necessitate the adoption of very different furnace practice.

Attending to the Practice of Combustion

Chemists, in particular, had neglected to pay sufficient attention to the practice of combustion of fuel in the fuel bed. Any system of controlling the process of combustion, on the one hand, to prevent smoke, and on the other to prevent the introduction of excessive air, must involve an accurate knowledge of how the processes took place. In the case of a hand-fired boiler furnace of the Lancashire type, if the door was opened and cold air let in smoking did not cease. With a heating furnace it was quite an easy matter to keep the grate completely covered with fuel, put on pressure, and gasify the fuel by primary air and admit hot secondary air above the grate. This was by no means easy to do with any boiler plant. The result was that most boiler plants were designed to deliver the whole of the air below the grate, and to attempt to control the flow of air into those parts of the grate which were covered with fuel and those parts which were covered with ashes. As far as he was aware, there had been only one set of experiments in which investigation had been made with regard to the character of the flow of the air through the grate. When air was supplied only below the grate it was often found that the CO_2 content of the waste gases depended really upon the rule-of-thumb skill of the stokers. The elimination of dust did not appear to be an impossible ideal for the future, while the amount of sulphur might be materially reduced by lowering the ash content of the fuel.

Waste Gases in the Atmosphere

In some plants practically the whole of the sulphur appeared in the waste gases as sulphur dioxide, though if there was a smoke effect the sulphur was not evolved as sulphur dioxide. This was a fact which had been discovered by the workmen in a glass factory he had visited, who stopped "sulphuring" of the glass by throwing lumps of coal into the furnace, the coal giving off a little hydrocarbon which created a reducing flame. By means of a reducing flame free sulphur was obtained which was carried away by the carbon and soot. It was not altogether sound reasoning to state that because CO_2 and SO_2 were heavier than air they must descend to the ground at some time, because waste gases from power plants were only about 5 per cent. heavier than air at equivalent temperatures, and, as a matter of fact, the SO_2 could not descend like dust but mixed with the atmosphere. Smoke itself tended naturally to flow upwards and disperse in the upper atmosphere, though sometimes there was an inverted temperature gradient in the air with the result that the smoke rose, then ceased to rise, and proceeded to form what was termed a "deck" or "layer."

A Bookman's Column

The general theory behind *The Conductivity of Solutions and the Modern Dissociation Theory*, by Mr. Cecil W. Davies, M.Sc. (Wales), A.I.C., senior lecturer in physical chemistry at the Battersea Polytechnic (Chapman and Hall, 15s., pp. 204) is that the theory of inter-ionic attraction, which, since its extension by Debye and Hückel, has won acceptance, does not displace, but really supplements, the much older theory of electrolytic dissociation associated with the name of Arrhenius, and that the modified Arrhenius theory is entering on a renewed career of greatly increased usefulness. We are thus, he reasons, for the first time in a position to calculate the degree of dissociation of salt solutions, and the compositions of their mixtures, at the concentrations employed in practice by chemists. The volume, which is written, of course, for advanced students, describes shortly the ionic dissociation and the inter-ionic attraction theories, explains the methods and results of conductivity measurements, and discusses some applications and consequences of the theory.

* * *

The title, *At Home Among the Atoms ; a First Book of Congenial Chemistry* (G. Bell and Sons, pp. 270, 7s. 6d.) has been carefully chosen, as the author, Professor James Kendall of Edinburgh, tells us, to indicate the informal as well as the chemical character of the book. The bright and racy (not "almost flippant") style indicates that it was never meant for the scientific expert, nor as a class-book for beginners, nor yet for the people who "think they think." What it attempts, in an unconventional style that is not overdone, is to give the intelligent layman in language he can understand some real insight into the subject. The author allows that Robert Boyle's complaint in 1661 is still too frequently justified: "A person anything versed in the writings of Chymists cannot but discern by their obscure, ambiguous, and almost ænigmatical way of expressing what they pretend to teach, that they have no mind to be understood at all, but by *the sons of Art* (as they call them), nor to be understood even by these without difficulty and hazardous trials." Professor Kendall hopes that his book will escape this accusation. We think it does.

* * *

Mr. Christopher T. Brunner, whose work on *The Problem of Oil* is just out from the Ernest Benn Press (pp. 231, 12s. 6d.), has had special opportunities of studying the oil problem, and he deals in this important book with the oil industry as it affects the British Isles, and traces more particularly the part played by it in the industrial and domestic life of the nation. Furthermore, he considers, against the background of world-embracing corporations and financial interests, the general organisation and operations of the concerns responsible for the distribution in Great Britain of the products of the oil industry. He describes clearly, from the economic and commercial standpoint, the production and marketing of the several products—benzine, kerosene and white spirit, fuel, gas and Diesel oil, lubricating oil and bitumen—which the oil companies supply, and concludes with a brief discussion of the future of oil. The book is of a convenient size, the style is simple and free from technical obscurities, the treatment of the subject is adequate without undue expansion, and the matter is thoroughly sound. A book of real use to all in the industry.

* * *

The important work on *Applied Inorganic Analysis*, by Dr. W. F. Hillebrand and Dr. G. E. F. Lundell, both members of the staff of the U.S. Bureau of Standards, is issued by Chapman and Hall (pp. 929, 42s. 6d.) just five years after the death of the first-named of the authors. The writing of the book was begun in 1923. Its scope had been decided upon and the work was well under way before Dr. Hillebrand's death in 1925. The book is comprehensive and, as one might expect, sound and scholarly. A good analyst, as defined by the authors, is "primarily a chemist who can quantitatively manufacture pure chemicals." The most elaborate precautions in weighing and measuring and in the final determination of the element go for naught if the analyst has failed to prepare quantitatively the compound on which the calculation is based and to free it quantitatively from all other compounds that would affect the calculation. That this may be very difficult is shown by the errors made in determinations of the atomic weights, in spite of extraordinary expenditure of time and effort. The aim throughout the present work has been to stress the preparation of the solution for the determination that is to be made, rather than to describe processes that can be used with certainty only in the specific applications for which they were devised.

Gas Light and Coke Company

Sir David Milne-Watson's Review

"We are every day increasing the outlets for the sale of gas by the installation of large numbers of appliances," said Sir David Milne-Watson (Governor), who presided at the 223rd ordinary general meeting of the Gas Light and Coke Co. at the chief offices at Westminster last week. During the year the revenue from gas went up by £292,000 and from rentals and fittings by £65,000. The only weak spot was to be found in residuals, and, although coke provided an increased revenue of £67,000, the other products fell away by over £134,000, chiefly accounted for by tar and its products.

An order for a coke installation capable of carbonising 1,200 tons of coal a day, and embodying in its construction all that was best in modern practice, said Sir David, had been placed last July with Messrs. Koppers, of Sheffield, and should be working in two years' time. Last month a large installation of continuous vertical retorts was put into operation, and the policy of the board ensured that new types of plant, as they were proved capable of reducing manufacturing costs, were quickly adopted. Gasholders of the waterless type introduced last year had given every satisfaction, and the largest, with a capacity of eight million cubic feet, had just been completed at Southall. American methods of painting were to be adopted, and it is hoped to make a fine engineering structure also pleasing to view.

New Smokeless Fuel

The low temperature plant at Richmond was put into action last March, and since then had worked continuously. The smokeless fuel produced had been placed on the market under the name of "Gloco." Over 8,000 tons had been sold, and many letters had been received expressing appreciation of its qualities as a fuel. To keep the plant working at full capacity 3,000 tons had to be sold every month. The tar oils obtained in the process had not proved so valuable or so marketable as was anticipated, and the company's research departments were giving serious consideration to the problem.

It was too early yet to say much about the commercial value of the process, but, so far as gas making was concerned, they had formed a not very favourable opinion of the low temperature process as compared with the high temperature processes usually adopted by gas undertakings. A full report will be made later on.

Active steps were being taken to encourage employers of all ranks to secure the best possible technical training and general education, and no fewer than 2,000 of them were now receiving help and advice on suitable courses of instruction.

The Coal Mines Bill

In the course of reference to the Coal Mines Bill, Sir David said the gas industry was largely, indeed almost entirely, dependent upon coal for the manufacture of gas. It was true that oil in considerable quantities was purchased for carburetting water gas, but in the year 1928, to take the latest figures available, carburetted water gas only amounted to, say, 15 per cent. of the total gas manufactured in this country. It was not the selling price of coal that had induced the Government to introduce the Bill, but their decision to shorten the miners' hours, and, as wages were not to be reduced, to placate the coalowners by enabling them to charge higher prices for their coal. They were, in effect, forcing the coal industry to convert itself into a monopolistic trust, which would adversely affect all the coal consumers in the country—and the gas industry most of all. "There are 36,000,000 people enjoying the benefit of gas in this country," added Sir David. "There are some 113,000 persons directly employed by the gas industry, and immense numbers indirectly employed. These are heavy responsibilities ; and I have no hesitation in saying that faced as we are with this partisan measure, it is the bounden duty of one and all to leave no stone unturned to ensure the rejection *in toto* of Part 1 of this Bill."

Sir Harold Hartley

Extensive Research Schemes for L.M.S.

We publish below a photograph of Sir Harold Hartley, whose appointment to the post of vice president and director of scientific research of the London Midland and Scottish Railway Company was announced in The Chemical Age of last week. It is now learned that an advisory council of eminent scientists is to be set up under his chairmanship.

Sir Harold's appointment was the result of the recommendations of a special Advisory Committee of scientists

(*Photo, by Elliott & Fry*)

Sir Harold Hartley.

appointed by Sir Josiah Stamp, president. The Committee had suggested that the scientific research carried out at present by the company could be extended with benefit. Sir Harold's activities will embrace the chemical, metallurgical, and physical sides of the organisation. He will exercise functions similar to that of general manager of several departments, including those of civil engineering, mechanical engineering, carriage and wagon construction, marine engineering, and signal and telegraph engineering.

There is already in existence on the L.M.S. a number of laboratories in which scientific research is being carried out, and part of Sir Harold's work will be done through these channels and their scope will be extended. Sir Harold will also carry a stage further the rationalisation of the company's workshops.

False Customs Declaration

A fine of £20 and three guineas costs was imposed on Douglas Kendal, of Upper Tulse Hill, at the Mansion House, London, on Tuesday, on a charge of making a false Customs declaration, by representing that W. J. and F. H. Bull, Ltd., had purchased outright nine cases of thorium nitrate from Deutsche Gasglühlicht Auer for £256 2s. 8d., whereas Messrs. Bull, Ltd., did not buy the chemical outright, nor was the price declared the true price. Mr. A. P. Davies, who appeared for the Department of Customs and Excise, replying to the Lord Mayor, said he did not suggest that the defendant knew the declaration was false, but he should not have signed it without knowing it was true. No appreciable sum, by way of duty, had been lost, because the Customs refused to accept the declaration as to price, and asked for a deposit, which was paid. Mr. C. J. R. Llewellyn, representing the defendant, said the worst which could be imputed to his client was that he had signed the declaration without sufficient inquiry as to its accuracy. He had no personal knowledge of the value of the chemical and derived no pecuniary advantage rom the transaction.

Chemical Engineers at Birminghhm

The Case for the Electric Furnace

The members of the Birmingham and Midland Section of the Society of Chemical Industry held their annual joint meeting with the Chemical Engineering Group from London at Birmingham on Friday, February 7. In the afternoon a visit was paid to the works of the General Electrical Co., and in the evening there was a lecture by Mr. A. G. Lobley, M.Sc. (Birmingham), on "Electric Furnaces for Heat Treatment," at the Chamber of Commerce. A dinner followed at the White Horse Hotel. Dr. H. W. Brownsdon presided at the meeting (in the absence of Mr. W. A. S. Calder), and he was supported by Messrs. H. Talbot (Chairman of the Chemical Engineering Group), W. F. Darke, F. A. Greene, S. J. Tungury, E. Reavell and A. J. Broughall.

Improved Heat Treatment Essential

Dr. Brownsdon said there was no doubt that the electric furnaces for use in the non-ferrous metal industries had come to stay. They were growing steadily in popularity, and not infrequently there was some delay in obtaining the equipment.

Mr. Lobley pointed out that improved heat treatment methods were essential to modern industry; and in many cases this could be obtained by means of electric furnaces with greater certainty and convenience than with other types. They ensured control of temperature in the distribution of heat in the furnace, and great uniformity of temperature or any required gradation. Other assets were the system of automatic temperature control; the control of the furnace atmosphere; cleanliness of working conditions; and the elimination of the human factor. Having flexibility, it was possible to adapt the design of the furnace and charging arrangements to the nature of the process, and to place the furnace exactly where it was required—in the line of flow of material. It was not always easy, the author pointed out, to assess the exact influence of such advantages on works costs; and it was unfortunate that the prospective user often overstressed the cost of electrical energy used. The suggestion was often made that in the cost of energy, current was more expensive than coal or coke, fuel oil, or producer gas, or coal gas, but such a compraison was fallacious or incomplete. The costs of gas per therm did not deal with energy in equally accessible states, whilst in the case of current it could be converted into accessible heat. This was not the case with energy from fuel combustion. It seemed to him that efficiency percentages were an important consideration; and while agreeing that every case must be taken on its merits, (in that the efficiencies of all furnaces varied considerably with the process involved) his contention was that an unassailable case was made out for the electric furnace.

Slides illustrating electric furnace installations in this country and America were shown and points of interest regarding these were described. A number of these consisted of box type furnaces for annealing, carburising and general heat treatment. Among other types were a rotary annular hearth furnace for re-heating; a small pusher type furnace with sealed chute for semi-bright annealing; a continuous rotary drum furnace of new and patented design for the annealing of small brass parts; two bright annealing furnaces with lift-off top; and an entirely new continuous furnace having a driven roller hearth.

Champion of Fuel Furnace

A discussion followed, in which Professor Cramp (Electrical Engineering Department, Birmingham University), Dr. Brownsdon, Mr. H. Talbot, Mr. W. A. Benton, Mr. Angus and Mr. Fallon took part. The last-named contended that carbonising furnaces, with oil or gas, were quite effective, and he added that in the large electric furnaces the opening of the door was a source of loss. He had full confidence in the modern fuel furnaces.

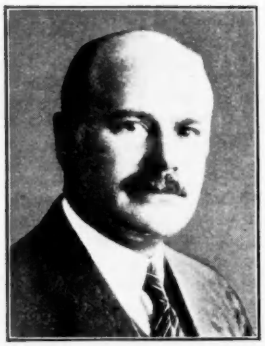
Professor Cramp inquired if it were not practical to make use of the induction furnaces for the heat treatment of non-ferrous metals; but Mr. Lobley said the standard of all-round efficiency was not, comparatively speaking, quite satisfactory.

Mr. Talbot agreed that a good case had been made out for the electric furnace for many classes of non-ferrous work. The fuel furnaces also had their own field, and so had producer gas, for dealing with ferrous material, In modern equipment the flue gases were utilised.

American Chemical Engineers' Institute

The New Executive Secretary

MR. FREDERIC J. LEMAISTRE, consulting chemical engineer of Philadelphia, has been appointed executive secretary of the American Institute of Chemical Engineers. The official headquarters of the organisation, which incidentally was founded in Philadelphia in 1908, are shortly to be transferred to the Bellevue Court Building in that city.



MR. FREDERIC J. LEMAISTRE

Mr. LeMaistre, a Canadian by birth, has been identified with American chemical industry ever since his graduation from McGill University in 1904. After two years with the American Cement Co. he joined the du Pont Company, and remained with them for fourteen years. During that period he received an unusually broad chemical engineering experience in the manufacture of explosives, solvents, pyroxylin and artificial silk. In 1916 he was given leave of absence by the du Pont Company in order that he might go to France as a member of the American Industrial Commission, which the French Chamber of Commerce had invited to study the technical problems involved in the reconstruction of the devastated area. Returning to du Pont, Mr. LeMaistre was appointed divisional head of the chemical department in charge of solvents, the position he occupied until he opened his consulting office in Philadelphia in 1920.

Mr. LeMaistre has been a member of the American Institute of Chemical Engineers since 1910. He is also a member of the American Chemical Society, the Chemists' Club (New York), the Franklin Institute, and the Union League Club of Philadelphia, and of the Wallingford and Springhaven Country Clubs. He is vice-president of the Ridley Park National Bank.

Dr. H. C. Parmelee, editorial director of the McGraw-Hill Publishing Co., who was recently elected honorary secretary, continues in that office, although relieved by Mr. LeMaistre of carrying the entire burden of the Institute activities.

Helium Repurification

Mobile Plant for Airships

A HELIUM repurification plant "of a mobility hitherto unattained" has been developed by the Helium Company of Louisville, Ky., for the Goodyear-Zeppelin Corporation of Akron, O., according to *Industrial and Engineering Chemistry*, journal of the American Chemical Society.

"The entire plant, with a capacity of 1,500 cubic feet of gas per hour, is mounted on a pneumatic-tyred trailer body, and can traverse any terrain which a truck can negotiate," states the journal. "Previously designed portable repurification plants have been limited in application by the fact that they were so heavy as to necessitate mounting on railroad cars.

"The mobile plant consists essentially of two compressors, one handling air, the other helium. The air compressor supplies air at high pressure to an expansion column, which serves to liquefy a portion of the air, forming a cooling bath at a temperature of 170° Cent. The second compressor forces helium at high pressure through copper coils immersed in this liquid air, with consequent removal of impurities by liquefaction. The helium passes through nearly a half-mile of copper tubing, and is finally discharged at a purity of 98 per cent. to any desired point and at any pressure up to 2,000 pounds per square inch. The loss in repurification is approximately one per cent.

"The mobile helium repurification plant was designed by R. R. Bottoms, director of research, and E. G. Luening, executive vice-president of the corporation which operates the Helium Co. These men were also responsible for the development of the special fuel gas used by the 'Graf Zeppelin' on its first return trip to Friedrichshafen from the United States."

Chemical Matters in Parliament

Employment Figures in Chemical Industry

MR. KELLY (House of Commons, February 10) asked the Minister of Labour the number of men and women registered as engaged in the chemical trade in 1928 and 1929; and the number unemployed in December, 1929, and January, 1930.

Miss Bondfield: In July, 1928, the estimated number of insured workpeople, aged 16-64, classified as belonging to the chemical industry in Great Britain was 99,750, of whom 77,450 were males and 22,300 females. The corresponding total for July, 1929, was 105,340 (81,410 males and 23,930 females). The number recorded as unemployed at December 16, 1929, was 7,188 (6,377 males and 811 females). Corresponding figures for January, 1930, are not yet available.

Protection Againt Chemical Warfare

Mr. T. Shaw (Secretary for War) stated in a written reply to Mr. Ayles that research work on protection against chemical warfare is being carried out at both Porton and Sutton Oak.

Dead Sea Salts Concession

Col. Howard-Bury (House of Commons, February 10) asked the Secretary of State for Foreign Affairs (1), whether, seeing that the Government is having recourse to arbitration as a means of settling the French claim to the Dead Sea salts concession, assent to such a course was notified to the French Ambassador before or after the Dead Sea salts concession was finally assigned to Mr. Moses Novomeysky; (2) whether, seeing that the question of the French claim on the Dead Sea salts was *sub judice* at the time of the conclusion of the agreement with Mr. Moses Novomeysky pending arbitration, and is a dangerous precedent in international affairs, he has received any further representations on the subject from the French Ambassador?

Mr. A. Henderson replied that it had not been decided whether the Government should agree to arbitration in this matter. The question was, therefore, not *sub judice*, and no assent to recourse to arbitration had been notified to the French Ambassador. He had not received any further representations on the subject.

Chemists and Fuel Developments

Papers and Discussion at Leeds

THE Yorkshire section of the Society of Chemical Industry and the Hull Chemical Engineering Society met for a mutually instructive evening last week, at the Great Northern Hotel, Leeds. Three papers on various aspects of the industry, especially in its relation to the development of fuel, were read by Hull members; and after each discussions took place on the points raised.

Mr. H. Wheldon, in the first paper, urged the efficient use of low grade coal and traced the development of the use of pulverised coal. "Forty years ago," he said, "the firing of boilers with pulverised coal was considered a laboratory experiment. To-day, engineers here developed the art to such an extent that the only economic method of raising steam is by pulverised firing." After dealing with various methods of such firing, leading to greater efficiency and ease of control, Mr. Wheldon appealed for greater interest in the abolition of the smoke pall over the large cities.

Mr. B. Stonham, in a paper on "Gaseous Fuel," gave an analysis of the many types of such fuel with their respective adaptabilities, comparing their use with that of raw coal. "With modern gas-fired furnaces," he said, "it is possible, with scientific control, to produce in the working chambers any temperature we please. This is exactly what is required in the processes of annealing, normalising and treatment of the carbo-steels. But in order to produce a non-oxidising atmosphere with coal-fired furnaces, it is necessary to tolerate partial combustion of the coal. This causes huge volumes of black smoke, laden with soot, to be emitted from the chimneys. Surely this use of raw coal is a national crime! For, apart from the pollution of the atmosphere, we are wasting a large portion of the useful constituents of the coal and making no use whatever of the valuable tars and oils. These reasons are not solely æsthetic, they are material, financial, economic."

Mr. G. H. Whyatt, in the last paper, gave a *resumé* of the development in the construction and design of the boiler apparatus in medium-sized works during the last twenty years.

From Week to Week

SALES of the German Potash Syndicate in January amounted to 186,000 tons, or 21,000 tons more than in the corresponding month last year.

RECENT WILLS include:—Mr. Harold Percy Algar (35), of St. Valerie, Rowton Grange Road, Chapel-en-le-Frith, described in his will as "chief chemist of a limited company" (net personalty £7,025), £8,291.

DAMAGE ESTIMATED at £15,000 was done by a fire on Saturday last, at the warehouse of Barnes and Crompton, manufacturing chemists, at Ribble Bank Mills, Preston. The top three of five storeys, containing large stocks of drugs, patent medicines and other goods, were completely destroyed.

FIRE followed the explosion of a flask containing vapour ether in the industrial chemical laboratory at Liverpool University on Monday. The fire brigade was called, but the outbreak was subdued by students in the room before its arrival. No one was injured, although a student was holding the flask when it exploded, and a window was shattered.

HOW THE REMOVAL OF STAINS has become a branch of the work of the chemist was explained in a lecture at Leicester Technical College, by Mr. H. L. Long, head of the chemistry section, who also gave several demonstrations of removing stains of the chemical, oily and mildew types. A book on the subject, he stated, had been published as early as 1583, when the majority of the garments worn were coloured.

DURING THE MONTH of October the Alsatian potash basin yielded 292,000 metric tons of crude sylvinite, a record production so far. The pure potash content was 44,500 metric tons. Since the beginning of 1929 these mines have produced 2,562,500 tons of crude sylvinite or 403,400 tons of pure K_2O, which represents, as compared with the first ten months of 1928, an increase of 20 per cent. in crude salts and 24 per cent. in pure potash.

THE NATIONAL FASCIST FEDERATION of Chemical and Allied Industries considers that a slight improvement in the Italian industrial situation developed during November, but market conditions still remain unsatisfactory. The chief difficulty is the lack of ready money with the consequent difficulty of obtaining credits and slowness in collections. The majority of consumers are still buying on a hand-to-mouth basis and the volume of orders for future delivery is still below normal.

A PLAN for limiting the manufacture of drugs and controlling their distribution throughout the world has been approved by the League of Nations Advisory Committee on Traffic in Opium and Other Dangerous Drugs. Each nation is to be asked to furnish annually an estimate of its requirements of drugs for medical and scientific purposes, and if it does not comply its estimate will be made by a central authority. No country will be allowed to import yearly more than the quantity estimated.

A LECTURE on the work of the textile laboratories of the Bradford Conditioning House was given by Mr. E. H. Townend (manager) at Keighley on Monday. Among the numerous chemical tests required, he said, damaged wools and waste were analysed to find whether the damage was caused by sea-water, fresh-water, fermentation, or by direct chemical action. Carbonised material was tested for acidity, tops and yarns analysed quantitatively for oil, soap residues and insoluble matters; raw silk for loss after de-gumming; cloths for loading, fastness of dye, proportions of cotton, wool, pure silk, artificial silk, or any other textile fibres which might have been used in the composition.

THE German liner *München* (14,000 tons) sank in the Hudson River, U.S., shortly after her arrival from Bremen on Tuesday morning as the result of fire, and a series of explosions, believed to have been caused by spontaneous combustion originating among sacks of nitrate stored in her hold. A fireboat and a railway tug, which went to her assistance, had their windows shattered 100 yards away by one of the explosions, and two hours after the liner had sunk a further boom was heard indicating that yet another explosion had taken place within the hull. The vessel was resting on the mud at the bottom of the river directly over the Hudson Tunnel, and all trains through the tunnel had to be stopped, as it was feared that another explosion might crack it.

"THE ROLE OF THE ANALYST" was the title of an address given to members of the Manchester section of the Institute of Chemistry by Mr. Edward Hinks, president of the Society of Public Analysts, on Thursday, February 6. There was great complexity in the work which had to be done by analysts in order to make workable the legislation which had been passed, he said, and the formation of the Society of Public and other Analytical Chemists was really due to the necessities which arose from the Sale of Food and Drugs Act. He maintained that analytical chemistry required the best brains that could be employed in its service, and the division sometimes made between research chemistry and analytical chemistry was false. There could be no research without analysis, and analytical work involved a good deal of progressive research.

THE NEW K.C.'s announced this week include Mr. W. Trevor Watson, well known as a junior counsel in many important chemical and patent actions.

DR. S. B. PERTH was elected chairman, and Mr. W. T. T. Ainsworth hon. secretary, at the annual meeting of the Nottingham section of the Society of Chemical Industry. A credit balance of £71 was reported.

UNIVERSITY NEWS: (*London*).—The degree of Doctor of Science in chemistry has been conferred on Mr. R. P. Linstead, of the Imperial College, Royal College of Science, for a thesis on "The Carbon Tautomerism."

DAMAGES ASSESSED AT £500 and costs were awarded at the Liverpool Sheriff's Court last week, against Mr. H. M. A. Pickup, aged 25, described as a technical chemist, of College Road, Waterloo, for breach of promise of marriage.

DR. C. V. DRYSDALE, director of scientific research under the Admiralty, has been appointed to the Explosives in Mines Research Committee, in place of Dr. F. E. Smith, F.R.S., who has become secretary to the Department of Scientific and Industrial Research.

IMPORTS of British manufactured dyestuffs into India during the first eight months of 1929 showed a marked increase over the same period of the previous year, being roughly 535,000 lb., against 350,000. This represents, however, only about 9 per cent. of the total imports into that country.

DR. JOHN WILFRED WHITAKER has been appointed Principal of the County Technical College and School of Art, Newark, as from April 1 next. He is 33 years of age, and is at present Senior Lecturer in Applied Science in the Department of Mining, University College, Nottingham, a position he has held since October, 1920. He is the author of several publications on mining, physics and chemistry.

ADDRESSING A MEETING of the Lancashire, Cheshire, and North Wales Council of the British Empire Cancer Campaign at Manchester, the Duke of York said that there seemed to be a unanimous consensus of scientific opinion that the best results in the development of radium treatment would be achieved by linking up as far as possible all radium work, with great central institutes which could maintain skilled staffs of radiologists.

RUSSIAN CAUSTIC SODA (the U.S. Trade Commissioner in Rome states) has been offered on the Italian market at prices considerably lower than can be met by American or European producers, and the remnant of the trade has passed to Russia. With the development of the Italian Solvay alkali output to the point of supplying practically all of the domestic requirements, there remains only a few hundred tons to be supplied by imports.

WORLD MINERAL BANKRUPTCY was prophesied by Sir Thomas H. Holland, Principal of Edinburgh University, in an address to the Mining Institute of Scotland on Saturday last. The total quantity of mineral consumed since 1900 exceeded that which was consumed in the whole history of the world before that year, and their destruction was even greater than before, because they were tending now to use only the rich deposits which satisfied their essential large-scale operations.

SOME REMARKABLE FIGURES illustrating the value of research in industry were given by Mr. E. Garcke, President of the British Electrical and Allied Industries Research Association, in his address at the annual meeting in London last week. Research done in regard to insulating oils, he said, had cost £8,500, but had saved the industry £100,000 a year; while scientific research into the heating of buried cables, which had cost about £18,500, had saved at least £245,000 and added something like £4,000,000 to the duration value of existing cables.

TRIBUTES TO THOMAS SUTCLIFFE MORT, who originated the idea of freezing meat for exportation, were paid at a dinner of the British Association of Refrigeration given at the Savoy Hotel, London, last week, to celebrate the fiftieth anniversary of the arrival of the first cargo of frozen meat from Australia to England. Lord Kylsant, who presided, said that our modern civilisation could hardly exist without the supplies of perishable produce from overseas rendered possible by the science of refrigeration. Brazil was now developing a most promising export of fresh fruit under refrigeration. Eighty per cent. of the world's marine refrigeration equipment was British made.

MR. H. C. YOUNG (Charles Macintosh and Co., Ltd.), in proposing the toast of the "Manchester Section of the Rubber Institution" at a dinner and dance in Manchester on Tuesday, presided over by Captain Gray, stated that the idea of establishing such an institution originated in Manchester, although its headquarters were now in London. The organisation had proved itself to be of definite advantage and value to the industry generally. American technicians, in particular, were constantly applying for its qualifications of either fellow or associate. He emphasised the necessity of combining the experience of the practical man with that of the chemist and physicist in order that the industry might be fully developed.

Patent Literature

The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.

Abstracts of Accepted Specifications

322,700. AMMONIUM PHOSPHATES. J. Guillissen, 7, Rue Gabrielle, Brussels, and Union Chimique Belge, Soc. Anon. 61, Avenue Louise, Brussels. Application date, February 22, 1929.

Crude phosphate is treated with sulphuric acid, and the solution of phosphoric acid obtained is diluted with water and sufficient ammonia added to precipitate iron, aluminium, and calcium salts. An excess of gaseous ammonia is passed into the filtrate, and most of the phosphoric acid is precipitated as tri-ammonium phosphate. This is separated and heated to obtain di- or mono-ammonium phosphates. The liquor may be used to dilute a fresh quantity of phosphoric acid.

322,701. HYDROGEN. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges. Frankfort-on-Main, Germany. Application date, February 22, 1929. Addition to 307,529 (see THE CHEMICAL AGE, Vol. XX, p. 359).

Some of the air used in the production of a nitrogen-hydrogen mixture for ammonia synthesis as described in Specification No. 307,529 is replaced by carbon dioxide obtained from the gas mixture resulting from the electric arc treatment. Thus, a mixture of methane 1·8 parts, air 2·8 parts, and carbon dioxide 0·8 part is treated in an electric arc, employing 2·6 amperes at 1,400 volts. The products are treated with steam in the presence of nickel, and the carbon dioxide, which is produced by conversion of carbon monoxide is removed by absorption. The resulting hydrogen-nitrogen mixture is in the correct proportion for the synthesis of ammonia. Some of the separated carbon dioxide may be added to a further mixture of air and methane.

322,734. HYDROGENATION OF CARBONACEOUS MATERIAL. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, September 3, 1928.

Coal, tar, mineral oils, etc., are destructively hydrogenated under pressure, and the products condensed under pressure and the constituents separated by fractional release of pressure. The hydrogen first obtained may be freed from hydrocarbons by heating, or by treating with steam or carbon dioxide at 500°–1,200° C. in the presence of iron or nickel, for use again in the hydrogenation. Further release of pressure liberates pentane, butane, propane, etc., which may be isolated by compression or cooling. Other reaction products may be separated by solvents or absorbents. An example is given of the treatment of the gas in a high pressure tower filled with Raschig rings, through which a current of middle oil is passed and subsequently subjected to release of pressure.

322,737. WETTING AGENTS, ETC. British Celanese, Ltd., 22, Hanover Square, London, G. H. Ellis, H. C. Olpin, and E. W. Kirk, of British Celanese, Spondon, near Derby. Application date, September 8, 1928.

Water-soluble wetting or dispersing agents are obtained by condensing furfural, or its derivatives such as methyl furfural, or furfuramide, with carbocyclic or heterocyclic aromatic compounds, and sulphonating the products if necessary. The aromatic compounds employed include aromatic hydrocarbons, tri- or polycyclic compounds such as naphthalene, anthracene, and carbazol, or crude products containing them, aromatic hydroxy compounds, halogenated aromatic compounds, or sulphonic acids of these. The condensation may be effected in the presence of sulphuric acid or sodium carbonate, or an aromatic compound may be sulphonated and simultaneously condensed with furfural. Colouring matters for cellulose esters and ethers may be ground with these dispersing agents, with or without water, or the colouring matters may be formed in the presence of the dispersing agents, with or without other protective colloids. The dispersing agents are employed in the coloration of cellulose esters such as the acetate, formate, propionate, or butyrate, or the products obtained by treating alkalized cellulose with esterifying agents, *e.g.*, *p*-toluene sulpho-chloride, or cellulose ethers such as methyl, ethyl, or benzyl cellulose, or the corresponding products from cellulose and glycols or other poly-hydric alcohols. Examples are given in which naphthalene, benzene, and phenol are sulphonated and the products condensed with furfural, and in which cellulose acetate fabric is dyed blue with diamino-anthrarufin or yellow with 2:4-diphenylamine, which are dispersed with the sodium salt of furfural-naphthalene-sulphonic acid. A larger number of other colouring matters are also specified.

322,745. BENZANTHRONE DERIVATIVES. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges. Frankfort-on-Main, Germany. Application date, September 7, 1928.

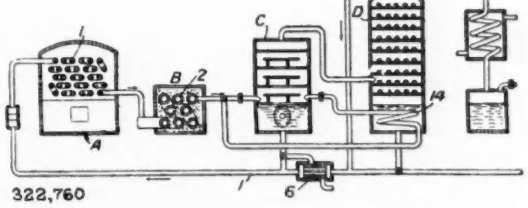
Benzanthrones substituted in the 2-position by the group $S.CH_2.COR$ where R is a hydrocarbon radicle, with or without other substituents in the benzanthrone nucleus, are treated with alkaline saponifying agents to obtain 2-methyl-benzanthrones. Thus, 2-chlor-benzanthrone is treated with sodium sulphide in alcoholic solution and the 2-mercapto-benzanthrone treated with mono-chlor-acetone, the resulting acetonyl-2-benzanthronyl-sulphide being then heated with sodium or potassium hydroxide in the presence of water or ethyl alcohol, or with anhydrous sodium sulphide and ethyl alcohol to obtain 2-methyl-benzanthrone. The same product is obtained from phenacyl-2-benzanthronyl sulphide and alcoholic potash.

322,749. EXTRACTING OILS. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, September 6, 1928.

Bituminous materials or the resinous materials obtained in the destructive hydrogenation of coal or shale are treated with the 80°—150° C. fraction of the destructive hydrogenation of coal, tars, mineral oils, etc., to extract the oils. The aromatic content of the solvent may be increased by treating with hydrogen at high temperature and pressure as described in Specifications Nos. 281,298 and 302,253 (see THE CHEMICAL AGE, Vol. XVIII, p. 104 and Vol. XX, p. 81), or by using only that portion soluble in liquid sulphur dioxide. The solvent may be mixed with alcohols, ketones, oil of turpentine, halogenated hydrocarbons, or other solvents. In an example, lignite is destructively hydrogenated and the residue containing 40 per cent. solids is treated at 80°–100° C. with an equal quantity of a product obtained by treating an oil obtained by destructively hydrogenating lignite with a stream of hydrogen at 600° C. under pressure. This product boils at 80°–150° C.

322,760. CRACKING OILS. A. Sachanen, 32, Alkhaniurtovskaya Street, Grosny, and M. Tilitscheyew, 66, Sovietskaya Street, Grosny, Russia. Application date, September 11, 1928.

Oil is passed at high pressure through tubes 1 in a heating zone A, and then through larger insulated tubes 2 in a reaction



322,760

zone B to an expansion chamber C. The tubes 2 are coiled to give a turbulent flow to the oil. The vapour passes on to a fractionating tower D at reduced pressure, and the condensate may be re-evaporated by passing the boil through a coil 14. The crude oil is pre-heated by the vapour from the tower D in heat-exchanger 4 and by residues from the separator C in heat-exchanger 6. Carbon is deposited only in the chamber C

Oil passes through the tubes 1 at 1–2 metres per sec. at a temperature of 450° C. The tubes 2 are 4–6 times the diameter of the tubes 1.

322,750. Dye Intermediates. J. Y. Johnson, London. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, September 6, 1928.

1 : 5-Dihalogen-anthraquinones are condensed with amino-aryl-*o*-carboxylic acids or their salts in the presence of acid binding agents and a copper compound in alcohols at temderatures above 150° C. The products are 1 : 5-di(*o*-carboxy-arylamino) anthraquinones, and purer products in better yields are obtained if pressure is used. In an example, potassium anthranilate is condensed with 1n : 5-dichlor anthraquinone in ethyl alcohol or N-butyl alcohol in an auto-clave at 150°–180° C. If benzyl alcohol is employed, the temperature should be 170°C. The product may be warmed with chlorsulphonic acid to obtain the di-acridone. In another example, sodium 5-chloranthranilate is condensed with 1 : 5-dichloranthraquinone in N-butyl alcohol at 170°–175° C. Reference is directed by the Comptroller to Spceification No. 312,678.

322,773 and 322,824. Dyes. Imperial Chemical Industries, Ltd., Millbank, London, and R. Brightman, Crumpsall Vale Chemical Works, Blackley, Manchester. Application date, September 12, 1928.

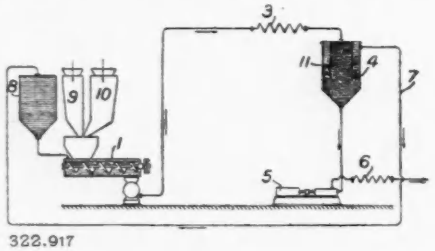
322,773. A 4-amino- or 4 : 4¹-diamino-diphenylamine is diazotised or tetrazotised and coupled with one or two molecular proportions of a 1 : 8-aminonaphthol sulphonic acid, or in the case of the tetrazo body, coupled with a 1 : 8-aminonaphthol sulphonic acid and another component. When a 4-amino-diphenylamine sulphonic acid is used, only monosulphonic acids of 1 : 8-aminonaphthol are employed. The products dye regenerated cellulose rayon in level shades—*e.g.*, light blue with the dyestuff 4 : 4¹-diamino-diphenylamine $\rightarrow$ (alkaline) 1 : 8-aminonaphthol-4-sulphonic acid. Particulars of a number of similar dyes are also given.

322,824. Dyes are obtained by tetrazotising and combining 4 : 4¹-diamino-diphenylamine or a derivative with a 2-amino-8-naphthol sulphonic acid or a derivative, or phenyl-J acid, or with these acids and another component. Level blue and violet shades are obtained with viscose silk. An example is given of dyeing with the dyestuff 4 : 4¹-diamino-diphenylamine $\rightarrow$ 2 : 8 : 6-acid (2 mols.). Various other coupling components are also specified.

322,909. Calcium Formate. F. W. Sefton-Jones, London. From Lonza Elektrizitatswerke und Chemische Fabriken Akt.-Ges., Basle, Switzerland. Application date, December 22, 1928.

Calcium oxide is treated with carbon monoxide at increased pressure and temperature, and the products are intensively mixed with calcium formate solution which is saturated when cold. Solid calcium formate separates at the end of the reaction, and the solution is then used again.

322,917. Destructive Hydrogenation. W. R. Tate and H. P. Stephenson, Norton Hall, The Green, Norton-on-Tees, and Imperial Chemical Industries, Ltd., Millbank, London. Application date, December 31, 1928.



322.917

A liquid carrier, coal, and a catalyst are supplied from three containers 8, 9, 10 respectively, and mixed to a thin suspension in a mixer 1. The mixture is pumped through a heater 3 to a separator 4 having an internal baffle 11. A thick paste is fed to the converters by a press 5 and a thin paste is returned to the liquid container 8.

Note.—Abstracts of the following specifications which are now accepted, appeared in The Chemical Age when they became open to inspection under the International Convention :—298,639 (Vereinigte Glanztoff-Fabriken Akt.-Ges.) relating to separation of sodium sulphate from sulphuric acid, see Vol. XIX, p. 565; 298,640 (I.G. Farbenindustrie Akt.-Ges.), relating to dinaphthylene dioxide quinone, see Vol. XIX, p. 590; 300,549 (J. R. Geigy Akt.-Ges.), relating to acid dyestuffs of the pheno-naphthosafranine series, see Vol. XX, p. 53; 301,864 and 309,023 (Kunstdunger-Patent-Verwertungs Akt.-Ges.), relating to leaching raw phosphate, see Vol. XX, pp. 130 and 546; 302,251 (I.G. Farbenindustrie Akt.-Ges.), relating to azo dyestuffs, see Vol. XX, p. 159; 303,482 (R. Winternitz), relating to cleansing of alkali lyes, see Vol. XX, p. 234; 308,980 (I.G. Farbenindustrie Akt.-Ges.), relating to isatins, see Vol. XX, p. 546.

Specifications Accepted with Date of Application

294,113. Generation of hydrogen. R. Battig. July 16, 1927.

297,463. Diminishing swelling in cellulose and cellulose products. I.G. Farbenindustrie Akt.-Ges. September 23, 1927.

299,327. Halogen-aryl-thioglycollic acids, Manufacture of. I.G. Farbenindustrie Akt.-Ges. October 22, 1927.

299,395. Electrolytical deposition of chromium. W. G. Poetzsch. October 25, 1927.

299,331. Azo-dyestuffs and intermediate products. Soc. of Chemical Industry in Basle. October 22, 1927.

300,662. Dyeing with anthraquinone vat dyes. Chemical Works, formerly Sandoz. November 18, 1927.

301,384 and 305,645. Sodium sulphide or similar inorganic chemical substances in the form of bodies of pre-determined shape and size, Preparation of. Kali-Chemie Akt.-Ges. November 28, 1927, and February 10, 1928. Additions to 233,316.

302,321. Trichlorethylene, Manufacture of. Consortium für Elektro-Chemische Industrie Ges. December 14, 1927.

302,683. Liquid fuels, Manufacture of—by hydrogenation of vaporous substances in the presence of catalysts. Compagnie Internationale pour la Fabrication des Essences et Pétroles. December 20, 1927.

310,757. Ortho-aryl-carboxy-amido-thioglycollic acids, Manufacture of. I.G. Farbenindustrie Akt.-Ges. April 28, 1928.

319,340. Higher hydrocarbons, Production of. F. Fischer. September 22, 1928.

324,311. Dyestuffs and dyestuff intermediates, Production of. J. F. Dunworth, J. Thomas, and Scottish Dyes, Ltd. July 16, 1928.

324,331. Separating salts or other solids from solutions thereof, Method and apparatus for. R. H. Wheeler. October 17, 1928.

324,348. Retorts for treating coal, peat, shale, and like substances. D. D. Shelton. July 19, 1928.

324,350. Separation of hydrocarbon mixtures by fractional distillation. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*). July 20, 1928.

324,357. Separation of liquid mixtures by fractional distillation. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*). July 20, 1928.

324,363. Metallic deposits from metal carbonyls, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*). October 12, 1928.

324,375. Reversible latex compositions, Production of. Dunlop Rubber Co., Ltd., E. A. Murphy and D. F. Twiss. July 26, 1928.

324,376. Distillation of hydrocarbon oils. H. Wade. (*Standard Oil Co. of Indiana.*) August 21, 1928.

324,382. Metal carbonyls, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) September 27, 1928.

324,443. Low-temperature method of cracking residual and fuel oil. W. M. Cranston. November 12, 1928.

324,484. Bromide-substituted aryl-1-thioglycollic acids, Manufacture of. O. Y. Imray. (*I.G. Farbenindustrie Akt.-Ges.*) December 20, 1928.

324,489. Vulcanization of synthetic rubber. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) December 27, 1928.

324,492. Oxidation of organic compounds of high molecular weight. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) December 31, 1928.

324,538. Organic acids and their salts, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) February 8, 1929.

324,541. Contact material for catalytic cracking and like operations. Compagnie Internationale pour la Fabrication des Essences et Pétroles. November 10, 1928.

324,589. Electro-deposition of metals. Imperial Chemical Industries, Ltd., and J. Hollins. April 24, 1929.

Applications for Patents

[In the case of applications for patents under the International Convention, the priority date (that is, the original application date abroad which the applicant desires shall be accorded to the patent) is given in brackets, with the name of the country of origin. Specifications of such applications are open to inspection at the Patent Office on the anniversary of the date given in brackets, whether or not they have been accepted.]

Anglo-Persian Oil Co., Ltd. Production of alkylene chlorhydrin. February 8. 4,359.

Bertleff, V. Manufacture of sulphonation products and their application in protecting metals from acids. February 5. 3,938.

Birch, S. F. Production of alkylene chlorhydrin. February 8. 4,359.

Birchall, H. Destructive hydrogenation, etc., of carbonaceous materials, etc. February 8. 4,335.

Böhme Akt.-Ges., H. T. Production of esters. February 5. (Germany, February 6, 1929.) 3,949.

Briers, F. Production of fertilisers. February 3. 3,599.

Brightman, R. Manufacture, etc., of disazo-dyestuffs. February 3. 3,592.

British Celanese, Ltd. Manufacture of organic esters of cellulose and coating-compositions containing same. February 5. (United States, November 5, 1927.) 3,870.

Broadhurst, H. F. Apparatus for concentrating liquids. February 3. 3,622.

Caro, N. Process for preparing alkaline earth cyanamides. February 4. (Germany, February 8, 1929.) 3,792.

—— Preparation of calcium cyanamide. February 6. (Germany, February 8, 1929.) 4,040.

Carpmael, A. (I.G. Farbenindustrie Akt.-Ges.). Manufacture of 1-hydroxy and 1-alkoxy anthraquinone-3-carboxylic acids. February 4. 3,776.

—— Manufacture of alkoxybenzophenone di- and tricarboxylic acids. February 5. 3,958.

—— Manufacture of aromatic bases. February 5. 3,959.

—— Manufacture of monoaroyldiamines of the benzene series. February 7. 4,244.

—— Manufacture of aqueous solutions. February 7. (August 29, 1929.) 4,247.

Chemische Fabrik Kalk Ges. Production of fertilisers. February 4. (Germany, February 7, 1929.) 3,699

Clark, A. M. Production of fertilisers. February 3. 3,599.

—— Production of fertilisers. February 8. 4,333. 4,334.

Compagnie de Bethune. Barbituric acid. February 5. (France, February 5, 1929.) 3,904.

Draper, O. H. Manufacture of black pigments of iron oxide, etc. February 5. 3,941.

Dunstan, A. E. Production of alkylene chlorhydrin. February 8. 4,359.

Ellis, G. B. (Soc. des Usines Chimiques Rhone-Poulenc). Manufacture of cellulose acetate. February 3. 3,675.

E.M.S. Industrial Processes, Ltd. Manufacture of calcium carbide. February 4. 3,818.

Frank, A. R. Process for preparing alkaline earth cyanamides. February 4. (Germany, February 8, 1929.) 3,792.

—— Preparation of calcium cyanamide. February 6. (Germany, February 8, 1929.) 4,040.

Gutehoffnungshütte Overhausen Akt.-Ges. Production of nitrogen-oxygen compounds. February 6. (Germany, February 6, 1929.) 4,107.

Holzverkohlungs-Industrie Akt.-Ges. Manufacture of acetic acid from acetaldehyde. February 3. (Germany, February 26, 1929.) 3,654.

Hooley, L. J. Production of dyestuffs, etc. February 4. 3,793.

(I.G. Farbenindustrie Akt.-Ges.). Manufacture of 1-hydroxy and 1-alkoxy anthra-quinone-3-carboxylic acids. February 4. 3,776.

—— Apparatus for carrying out chemical reactions. February 5. 3,905.

—— Manufacture of alkoxybenzophenone di- and tricarboxylic acids. February 5. 3,958.

—— Manufacture of aromatic bases. February 5. 3,959.

—— Production of halogen derivatives of dibenzanthrone, etc., series. February 7. (June 4, 1929.) 4,189.

—— Manufacture of dibenzanthrones, etc., containing chlorine and bromine. February 7. (May 22, 1929.) 4,190.

—— Manufacture of monoaroyldiamines of the benzene series. February 7. 4,244.

—— Manufacture of aqueous solutions. February 7. (August 29, 1929.) 4,247.

I.G. Farbenindustrie Akt.-Ges. Device for ascertaining quantities of ingredients for preparing dye-baths. February 3. (Germany, February 2, 1929.) 3,671.

—— Manufacture of condensation products of benzanthrone series. February 7. (Germany, February 7, 1929.) 4,200.

—— Manufacture of pigments in high state of dispersion. February 7. (Germany, February 7, 1929.) 4,201.

Imperial Chemical Industries, Ltd. Water-gas generators. February 3. 3,567.

—— Manufacture, etc., of diazo dyestuffs. February 3. 3,592.

—— Stabilisation of hydrocyanic acid. February 3. 3,598.

—— Production of fertilisers. February 3. 3,599.

—— Transporting or storing pulverised coal, etc. February 7. 4,160.

—— Production of fertilisers. February 8. 4,333, 4,334.

—— Destructive hydrogenation, etc., of carbonaceous materials, etc. February 8. 4,335, 4,336.

Jackson, L. Mellersh-. (New Jersey Zinc Co.). Reducing zinciferous materials containing lead. February 3. 3,669.

—— Dyeing acetate silks, etc. February 3. 3,637.

Johnson, J. Y. (I.G. Farbenindustrie Akt.-Ges.). Apparatus for carrying out chemical reactions. February 5. 3,905.

—— Manufacture of resinous masses. February 5. 3,906.

—— Manufacture of wetting, cleansing, etc., agents. February 5. 3,907.

—— Apparatus for supplying liquid to another flowing liquid. February 6. 4,044.

—— Preparations for use in textile industry. February 6. 4,045.

—— Production of halogen derivatives of dibenzanthrone, etc., series. February 7. (June 4, 1929.) 4,189.

—— Manufacture of dibenzanthrones, etc., containing chlorine and bromine. February 7. (May 22, 1929.) 4,190.

Mouipied, A. T. de. Manufacture of calcium carbide. February 4. 3,818.

Quin, J. P. Stabilisation of hydrocyanic acid. February 3. 3,598.

Scottish Dyes, Ltd. Production of dyestuffs, etc. February 4. 3,793.

Selden Co. Catalysis. February 8. (United States, February 8, 1929.) 4,361.

(Soc. des Usines Chimiques Rhone-Poulenc). Manufacture of cellulose acetate. February 3. 3,675.

Soc. des Usines Chimiques Rhone-Poulenc. Manufacture of compound glass. February 7. (France, April 13, 1929.) 4,251.

World Capacity of Casale Ammonia Plants

DATA supplied by the Casale Ammonia Co. show that 22 plants with 901 metric tons daily capacity of anhydrous ammonia are now operating throughout the world as compared with 18 plants having 655 tons capacity in December, 1927. In addition, new units are under construction for additional daily capacity of 566 tons. The following table shows plants operating and additional capacity under construction in different countries in metric tons, per day :—

	Operating	Building
Italy	41	16
Belgium	80	180
Canada	8	—
Dalmatia	—	48
France	388	8
Germany	60	90
Japan	262	200
Russia	24	24
Switzerland	23	—
United States	15	—

The countries increasing the daily capacity since 1927 were as follows (increase in metric tons per day) : Belgium 56, France 49, Germany 60, Canada 8, Japan 100.

The Ammonia Casale Co. states that experience has proved that the Casale process operates with hydrogen obtained from coke oven gas or from water gas as successfully as with that derived from the electrolysis of water, for which it was originally intended. In fact, of the total plants operating on the Casale process, 14 are using coke oven gas hydrogen, three water gas hydrogen, and one by-product hydrogen. It is further stated that in the plants using coke oven gas hydrogen the rated production capacity of the Casale units has been actually exceeded by quantities varying from 25 to 50 per cent. in continuous operation.

German Activated Carbon Consolidation

ACTIVATED carbon production and marketing in Germany has heretofore been divided between two dominating groups : (1) "Carbo-Union," a triangular association of the German dye trust ; the Metallbank, Frankfort-on-the-Main ; and Aussiger Verein (Czechoslovakia), on the one hand and (2) the Urbain Corporation ; Verein fuer chemische Industrie, Frankfort-on-the-Main ; and N.V. Allgemeene Norit Maatschappij, Amsterdam, on the other. Both groups have now united certain common resources, including processes, while entering into agreement on rationalised marketing, doubtlessly including uniform prices.

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemicals

ACID ACETIC, 40% TECH.—£19 per ton.
ACID, CHROMIC.—1s. 0⅝d. per lb.
ACID HYDROCHLORIC.—Spot, 3s. 9d. to 6s. per carboy d/d, according to purity, strength and locality.
ACID NITRIC, 80° Tw.—Spot £20 to £25 per ton, makers' works according to district and quality.
ACID SULPHURIC.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations; 140° Tw., Crude Acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.
AMMONIA (ANHYDROUS).—Spot, 10d. per lb., d/d in cylinders.
AMMONIUM BICHROMATE.—8¼d. per lb.
BISULPHITE OF LIME.—£7 10s. per ton, f.o.r. London, packages free.
BLEACHING POWDER, 35%.—Spot, £7 10s. per ton d/d station in casks, special terms for contracts.
BORAX, COMMERCIAL.—Crystals, £19 10s. to £20 per ton; granulated, £12 10s. per ton; powder, £14 per ton. (Packed in 1 cwt. bags carriage paid any station in Great Britain.)
CALCIUM CHLORIDE (SOLID).—Spot, £4 15s. to £5 5s. per ton d/d in drums.
CHROMIUM OXIDE.—10d. and 10½d. per lb. according to quantity.
COPPER SULPHATE.—£25 to £25 10s. per ton.
METHYLATED SPIRIT 61 O.P.—Industrial, 1s. 3d. to 1s. 8d. per gall. pyridinised industrial, 1s. 5d. to 1s. 10d. per gall.; mineralised 2s. 4d. to 2s. 8d. per gall.; 64 O.P., 1d. extra in all cases.
NICKEL SULPHATE.—£38 per ton d/d.
NICKEL AMMONIA SULPHATE.—£38 per ton d/d.
POTASH CAUSTIC.—£30 to £33 per ton.
POTASSIUM BICHROMATE CRYSTALS AND GRANULAR.—4⅜d. per lb. nett d/d U.K. spot; ground ½d. per lb. extra.
POTASSIUM CHLORATE.—3⅞d. per lb., ex-wharf, London, in cwt. kegs.
POTASSIUM CHROMATE.—8¼d. per lb.
SALAMMONIAC.—Firsts lump, spot, £42 10s. per ton d/d station in barrels. Chloride of ammonia, £37 to £45 per ton, carr. paid.
SALT CAKE, UNGROUND.—Spot, £3 7s. 6d. per ton d/d station in bulk.
SODA ASH, 58° E.—Spot, £6 per ton, f.o.r. in bags, special terms for contracts.
SODA CAUSTIC, SOLID, 76/77%.—Spot, £14 10s. per ton, d/d station in drums.
SODA CRYSTALS.—Spot, £5 to £5 5s. per ton, d/d station or ex depot in 2 cwt. bags.
SODIUM ACETATE 97/98%.—£21 per ton.
SODIUM BICARBONATE, REFINED.—Spot, £10 10s. per ton d/d station in bags.
SODIUM BICHROMATE CRYSTALS.—3⅝d. per lb. nett d/d U.K. spot. Anhydrous ¾d. per lb. extra.
SODIUM BISULPHITE POWDER, 60/62%.—£17 10s. per ton delivered for home market, 1-cwt. drums included; £15 10s. f.o.r. London.
SODIUM CHLORATE.—2¾d. per lb.
SODIUM CHROMATE.—3½d. per lb.
SODIUM NITRITE.—Spot, £19 per ton, d/d station in drums.
SODIUM PHOSPHATE.—£14 per ton, f.o.b. London, casks free.
SODIUM SILICATE, 140° Tw.—Spot, £8 5s. per ton, d/d station returnable drums.
SODIUM SULPHATE (GLAUBER SALTS).—Spot, £4 2s. 6d. per ton, d/d address in bags.
SODIUM SULPHIDE CONC. SOLID.—Spot, £10 5s. per ton d/d in drums. Crystals—Spot, £7 10s. per ton d/d in sellers' casks.
SODIUM SULPHITE, PEA CRYSTALS.—Spot, £13 10s. per ton, d/d station in kegs. Commercial—Spot, £9 per ton, d/d station in bags.

Coal Tar Products

ACID CARBOLIC CRYSTALS.—7d. to 8d. per lb. Crude 60's, 2s. 4d. to 2s. 6d. per gall.
ACID CRESYLIC 99/100.—2s. 2d. to 2s. 6d. per gall. Pure, 5s. to 5s. 2d. per gall. 97/99.—2s. 1d. to 2s. 2d. per gall. Pale, 95%, 1s. 9d. to 1s. 10d. per gall. 98%, 2s. 2d. to 2s. 3d. Dark, 1s. 6d. to 2s. Refined, 2s. 7d. to 2s. 10d. per gall.
ANTHRACENE.—A quality, 2d. to 2½d. per unit. 40%, £4 10s. per ton.
ANTHRACENE OIL, STRAINED, 1080/1090.—4¾d. to 5¼d. per gall. 1100, 5¼d. to 6d. per gall.; 1110, 6d. to 6½d. per gall. Unstrained (Prices only nominal).
BENZOLE.—Prices at works: Crude, 10d. to 11d. per gall.; Standard Motor, 1s. 5d. to 1s. 6d. per gall.; 90%, 1s. 7d. to 1s. 8d. per gall.; Pure, 1s. 10d. to 1s. 11d. per gall.
TOLUOLE.—90%, 1s. 9d. to 2s. 1d. per gall. Firm. Pure, 1s. 11d. to 2s. 5d. per gall.
XYLOL.—1s. 5d. to 1s. 10d. per gall. Pure, 1s. 8d. to 2s. 1d. per gall.
CREOSOTE.—Cresylic, 20/24%, 6¾d. to 7d. per gall.; Heavy, for Export, 6⅛d. to 6⅜d. per gall. Home, 4½d. per gall. d/d. Middle oil, 4½d. to 5d. per gall. Standard specification, 3d. to 4d. per gall. Light gravity, 1¼d. to 1⅜d. per gall. ex works. Salty, 7½d. per gall.
NAPHTHA.—Crude, 8¼d. to 8⅜d. per gall. Solvent, 90/160, 1s. 3d. to 1s. 3½d. per gall. Solvent, 95/160, 1s. 4d. to 1s. 6d. per gall. Solvent 90/190, 1s. to 1s. 2½d. per gall.
NAPHTHALENE, CRUDE.—Drained Creosote Salts, £4 10s. to £5 per ton. Whizzed, £5 per ton. Hot pressed, £8 10s. per ton.
NAPHTHALENE.—Crystals, £12 5s. per ton. Purified Crystals, £14 10s. per ton. Flaked, £14 to £15 per ton, according to districts.
PITCH.—Medium soft, 46s. to 47s. 6d. per ton, f.o.b., according to district. Nominal.
PYRIDINE.—90/140, 3s. 9d. to 4s. per gall. 90/160, 3s. 6d. to 3s. 9d. per gall. 90/180, 1s. 9d. to 2s. 3d. per gall. Heavy prices only nominal.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated:

ACID AMIDONAPHTHOL DISULPHO (1-8-2-4).—10s. 9d. per lb.
ACID ANTHRANILIC.—6s. per lb. 100%.
ACID BENZOIC.—1s. 8½d. per lb.
ACID GAMMA.—3s. 9d. per lb. 100% d/d buyer's works.
ACID H.—2s. 3d. per lb. 100% d/d buyer's works.
ACID NAPHTHIONIC.—1s. 6d. per lb. 100% d/d buyer's works.
ACID NEVILLE AND WINTHER.—2s. 7d. per lb. 100% d/d buyer's works.
ACID SULPHANILIC.—8½d. per lb. 100% d/d buyer's works.
ANILINE OIL.—8½d. per lb., drums extra, d/d buyer's works.
ANILINE SALTS.—8½d. per lb. d/d buyer's works.
BENZALDEHYDE.—1s. 8d. per lb., packages extra, d/d buyer's works.
BENZIDINE BASE.—2s. 4d. per lb. 100% d/d buyer's works.
BENZOIC ACID.—1s. 8¼d. per lb. d/d buyer's works.
o-CRESOL 29/31° C.—£3 1s. 10d. per cwt., in 1 ton lots.
m-CRESOL 98/100%.—2s. 9d. per lb., in ton lots d/d.
p-CRESOL 32/34° C.—2s. per lb., in ton lots d/d.
DICHLORANILINE.—2s. 5d. per lb.
DIMETHYLANILINE.—1s. 9½d. per lb., drums extra d/d buyer's works.
DINITROBENZENE.—7⅞d. per lb.
DINITROCHLORBENZENE.—£84 per ton d/d.
DINITROTOLUENE.—48/50° C., 7d. per lb.; 66/68° C., 8¼d. per lb.
DIPHENYLAMINE.—1s. 8d. per lb. d/d buyer's works.
α-NAPHTHOL.—1s. 11d. per lb. d/d buyer's works.
B-NAPHTHOL.—£65 per ton in 1 ton lots, d/d buyer's works.
α-NAPHTHYLAMINE.—1s. per lb. d/d buyer's works.
B-NAPHTHYLAMINE.—2s. 9d. per lb. d/d buyer's works.
o-NITRANILINE.—5s. 11d. per lb.
m-NITRANILINE.—2s. 6d. per lb. d/d buyer's works.
p-NITRANILINE.—1s. 8d. per lb. d/d buyer's works.
NITROBENZENE.—6½d. per lb, 5-cwt. lots, drums extra, d/d buyer's works.
NITRONAPHTHALENE.—9d. per lb.
R. SALT.—2s. per lb. 100% d/d buyer's works.
SODIUM NAPHTHIONATE.—1s. 6½d. per lb. 100% d/d buyer's works.
o-TOLUIDINE.—8d. per lb., drums extra, d/d buyer's works.
p-TOLUIDINE.—1s. 9d. per lb. d/d buyer's works.
m-XYLIDINE ACETATE.—3s. 4d. per lb. 100%.
N. W. ACID.—4s. 9d. per lb. 100%.

Wood Distillation Products

ACETATE OF LIME.—Brown, £9 15s. to £10 5s. per ton. Grey, £16 10s. to £17 10s. per ton. Liquor, 9d. per gall.
ACETONE.—£78 per ton.
CHARCOAL.—£6 to £8 10s. per ton, according to grade and locality.
IRON LIQUOR.—1s. 3d. per gall. 32° Tw. 1s. per gall. 24° Tw.
WOOD CREOSOTE.—1s. 9d. per gall., unrefined.
WOOD NAPHTHA, MISCIBLE.—3s. 8d. to 3s. 11d. per gall. Solvent, 4s. to 4s. 3d. per gall.
WOOD TAR.—£3 10s. to £4 10s. per ton.
BROWN SUGAR OF LEAD.—£38 per ton.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6½d. to 1s. 3d. per lb. according to quality; Crimson, 1s. 4d. to 1s. 6d. per lb., according to quality.
ARSENIC SULPHIDE, YELLOW.—1s. 10d. to 2s. per lb.
BARYTES.—£5 10s. to £7 per ton, according to quality.
CADMIUM SULPHIDE.—5s. to 6s. per lb.
CARBON BISULPHIDE.—£25 to £27 10s. per ton, according to quantity.
CARBON BLACK.—4½d. per lb., ex wharf.
CARBON TETRACHLORIDE.—£40 to £50 per ton, according to quantity, drums extra.
CHROMIUM OXIDE, GREEN.—1s. 2d. per lb.
DIPHENYLGUANIDINE.—3s. 9d. per lb.
LITHOPONE, 30%.—£20 to £22 per ton.
SULPHUR.—£10 to £13 per ton, according to quality.
SULPHUR CHLORIDE.—4d. to 7d. per lb., carboys extra.
SULPHUR PRECIP. B.P.—£55 to £60 per ton.
ZINC SULPHIDE.—8d. to 11d. per lb.

Pharmaceutical and Photographic Chemicals

ACID, ACETIC, PURE, 80%.—£37 per ton, ex wharf London, barrels free.

ACID, ACETYL SALICYLIC.—2s. 9d. to 2s. 11d. per lb., according to quantity.

ACID, BENZOIC B.P.—2s. to 3s. 3d. per lb., according to quantity. Solely ex Gum, 1s. 6d. per oz.; 50-oz. lots, 1s. 3d. per oz.

ACID, BORIC B.P.—Crystal, £32 per ton; powder, £36 per ton; extra fine powder, £38 per ton. Packed in 2-cwt. bags carriage paid any station in Great Britain.

ACID, CAMPHORIC.—19s. to 21s. per lb.

ACID, CITRIC.—1s. 10½d. to 1s. 10¾d. per lb., less 5%.

ACID, GALLIC.—2s. 8d. per lb. for pure crystal, in cwt. lots.

ACID, MOLYBDIC.—5s. 3d. per lb. in ¼ cwt. lots. Packages extra. Special prices for quantities and contracts.

ACID, PYROGALLIC, CRYSTALS.—7s. 3d. per lb. Resublimed, 8s. 3d.

ACID, SALICYLIC, B.P. PULV.—1s. 5d. to 1s. 7d. per lb. Technical.—1s. to 1s. 2d. per lb.

ACID, TANNIC B.P.—2s. 8d. to 2s. 10d. per lb.

ACID, TARTARIC.—1s. 3¼d. per lb., less 5%.

ACETANILIDE.—1s. 5d. to 1s. 8d. per lb. for quantities.

AMIDOL.—7s. 6d. to 9s. per lb., d/d.

AMIDOPYRIN.—7s. 9d. to 8s. per lb.

AMMONIUM BENZOATE.—3s. 3d. to 3s. 9d. per lb., according to quantity. 18s. per lb. ex Gum.

AMMONIUM CARBONATE B.P.—£36 per ton. Powder, £39 per ton in 5 cwt. casks. Resublimated, 1s. per lb.

AMMONIUM MOLYBDATE.—4s. 9d. per lb. in ¼ cwt. lots. Packages extra. Special prices for quantities and contracts.

ATROPHINE SULPHATE.—9s. per oz.

BARBITONE.—5s. 9d. to 6s. per lb.

BENZONAPHTHOL.—3s. to 3s. 3d. per lb .spot.

BISMUTH CARBONATE.—8s. 9d. per lb.

BISMUTH CITRATE.—8s. 3d. per lb.

BISMUTH SALICYLATE.—8s 3d. per lb.

BISMUTH SUBNITRATE.—7s. 6d. per lb.

BISMUTH NITRATE.—Cryst. 5s. 3d. per lb.

BISMUTH OXIDE.—11s. 3d. per lb.

BISMUTH SUBCHLORIDE.—10s. 3d. per lb.

BISMUTH SUBGALLATE.—7s. 3d. per lb. Extra and reduced prices for smaller and larger quantities of all bismuth salts respectively.

BISMUTHI ET AMMON LIQUOR.—Cit. B.P. in W. Qts. 1s. 0¼d. per lb.; 12 W. Qts. 11¼d. per lb.; 36 W. Qts. 11d. per lb.

BORAX B.P.—Crystal, £21 per ton; powder, £22 per ton; powder, ex. fine, £23 per ton. Packed in 1-or 2-cwt. bags carriage paid any station in Great Britain.

BROMIDES.—Ammonium, 2s. 0d. per lb.; potassium, 1s. 8d. per lb.; granular, 1s. 5½d. to 1s. 7¾d. per lb.; sodium, 1s. 11d. per lb. Prices for 1 cwt. lots.

CALCIUM LACTATE.—B.P., 1s. 2d. to 1s. 5d. per lb., in 1-cwt. lots.

CAMPHOR.—Refined flowers, 3s. 3d. to 3s. 4d. per lb., according to quantity; also special contract prices.

CHLORAL HYDRATE.—3s. 1d. to 3s. 4d. per lb.

CHLOROFORM.—2s. 4½d. to 2s. 7½d. per lb., according to quantity.

CREOSOTE CARBONATE.—6s. per lb.

ETHERS.—S.G. ·730—11d. to 1s. per lb., according to quantity; other gravities at proportionate prices.

FORMALDEHYDE, 40%.—37s. per cwt., in barrels, ex wharf.

GUAIACOL CARBONATE.—4s. 6d. to 4s 9d. per lb.

HEXAMINE.—2s. 3d. to 2s. 6d. per lb.

HOMATROPINE HYDROBROMIDE.—30s. per oz.

HYDRASTINE HYDROCHLORIDE.—English make offered at 120s. per oz.

HYDROGEN PEROXIDE (12 VOLS.).—1s. 4d. per gallon, f.o.r. makers' works, naked. Winchesters, 2s. 11d. per gall. B.P., 10 vols., 2s. to 2s. 3d. per gall.; 20 vols., 4s. per gall.

HYDROQUINONE —3s. 9d. to 4s. per lb., in cwt. lots.

HYPOPHOSPHITES.—Calcium, 2s. 5d. per lb.; potassium, 2s. 8½d. per lb.; sodium, 2s. 7½d. per lb., in 1 cwt. lots, assorted.

IRON AMMONIUM CITRATE.—B.P., 2s. 8d. to 2s. 9d. per lb. Green, 2s. 10d. to 3s. per lb. U.S.P., 2s. 7d. to 2s. 10d. per lb.

IRON PERCHLORIDE.—18s. to 20s. per cwt., according to quantity.

IRON QUININE CITRATE.—B.P., 8¾d. to 9¼d. per oz., according to quantity.

MAGNESIUM CARBONATE.—Light commercial, £31 per ton net.

MAGNESIUM OXIDE.—Light commercial, £62 10s. per ton, less 2½%. Heavy commercial, £21 per ton, less 2½%; in quantity low er Heavy Pure, 2s. to 2s. 3d. per lb.

MENTHOL.—A.B.R. recrystallised B.P., 17s. 6d. per lb. net; Synthetic, 9s. 6d. to 11s. 9d. per lb.; Synthetic detached crystals, 9s. 6d. to 11s. 9d. per lb., according to quantity; Liquid (95%), 9s. per lb.

MERCURIALS B.P.—Up to 1 cwt. lots, Red Oxide, crystals, 8s. 4d. to 8s. 5d. per lb., levig., 7s. 10d. to 7s. 11d. per lb.; Corrosive Sublimate, Lump, 6s. 7d. to 6s. 8d. per lb., Powder, 6s. to 6s. 1d. per lb.; White Precipitate, Lump, 6s. 9d. to 6s. 10d. per lb., Powder, 6s. 10d. to 6s. 11d. per lb., Extra Fine, 6s. 11d. to 7s. per lb.; Calomel, 7s. 2d. to 7s. 3d. per lb.; Yellow Oxide, 7s. 8d. to 7s. 9d. per lb.; Persulph, B.P.C., 6s. 11d. to 7s. per lb.; Sulph. nig., 6s. 8d. to 6s. 9d. per lb. Special prices for larger quantities.

METHYL SALICYLATE.—1s. 6d. to 1s. 8d. per lb.

METHYL SULPHONAL.—18s. 6d. to 20s. per lb.

METOL.—9s. to 11s. 6d. per lb. British make.

PARAFORMALDEHYDE.—1s 9d. per lb. for 100% powder.

PARALDEHYDE.—1s. 4d. per lb.

PHENACETIN.—3s. 2½d. to 3s. 9d. per lb.

PHENAZONE.—5s. 11d. to 6s. 1½d. per lb.

PHENOLPHTHALEIN.—5s. 11d. to 6s. 1½d. per lb.

POTASSIUM BITARTRATE 99/100% (Cream of Tartar).—103s. per cwt., less 2½ per cent.

POTASSIUM CITRATE.—B.P.C., 2s. 6d. per lb. in 28 lb. lots. Smaller quantities 1d. per lb. more.

POTASSIUM FERRICYANIDE.—1s. 9d. per lb., in cwt. lots.

POTASSIUM IODIDE.—16s. 8d. to 17s. 2d. per lb., according to quantity.

POTASSIUM METABISULPHITE.—6d. per lb., 1-cwt. kegs included f.o.r. London.

POTASSIUM PERMANGANATE.—B.P. crystals, 5½d per lb., spot.

QUININE SULPHATE.—1s. 8d. to 1s. 9d. per oz., bulk in 100 oz. tins

RESORCIN.—2s. 10d. to 3s. per lb., spot.

SACCHARIN.—43s. 6d. per lb.

SALOL.—2s. 3d. to 2s. 6d. per lb.

SODIUM, BENZOATE B.P.—1s. 8d. to 1s. 11d. per lb.

SODIUM CITRATE, B.P.C., 1911, AND U.S.P. VIII.—2s. 2d. per lb., B.P.C. 1923, and U.S.P. IX—2s. 6d. per lb. Prices for 28 lb. lots. Smaller quantities 1d. per lb. more.

SODIUM FERROCYANIDE.—4d. per lb., carriage paid.

SODIUM HYPOSULPHITE, PHOTOGRAPHIC.—£15 per ton, d/d consignee's station in 1-cwt. kegs.

SODIUM NITROPRUSSIDE.—16s. per lb.

SODIUM POTASSIUM TARTRATE (ROCHELLE SALT).—100s. per cwt. Crystals, 5s. per cwt. extra.

SODIUM SALICYLATE.—Powder, 2s. 2d. to 2s. 3d. per lb. Crystal, 2s. 3d. to 2s. 4d. per lb.

SODIUM SULPHIDE, PURE RECRYSTALLISED.—10d. to 1s. 1d. per lb.

SODIUM SULPHIDE, ANHYDROUS.—£27 10s. to £29 10s. per ton, according to quantity. Delivered U.K.

SULPHONAL.—9s. 6d. to 10s. per lb.

TARTAR EMETIC, B.P.—Crystal or powder, 2s. 1d. to 2s. 3d. per lb.

THYMOL.—Puriss, 7s. 9d. to 8s. 6d. per lb., according to quantity. Firmer. Natural, 12s. per lb.

Perfumery Chemicals

ACETOPHENONE.—7s. per lb.

AUBEPINE (EX ANETHOL).—12s. per lb.

AMYL ACETATE.—2s. 6d. per lb.

AMYL BUTYRATE.—5s. per lb.

AMYL CINNAMIC ALDEHYDE.—12s. per lb.

AMYL SALICYLATE.—3s. per lb.

ANETHOL (M.P. 21/22° C.).—6s. 6d. per lb.

BENZALDEHYDE FREE FROM CHLORINE.—2s. 6d. per lb.

BENZYL ACETATE FROM CHLORINE-FREE BENZYL ALCOHOL.—2s. per lb.

BENZYL ALCOHOL FREE FROM CHLORINE.—2s. per lb.

BENZYL BENZOATE.—2s. 3d. per lb.

CINNAMIC ALDEHYDE NATURAL.—13s. 3d. per lb.

COUMARIN.—8s. 3d. per lb.

CITRONELLOL.—10s. 6d. per lb.

CITRAL.—8s. per lb.

ETHYL CINNAMATE.—6s. 6d. per lb.

ETHYL PHTHALATE.—2s. 9d. per lb.

EUGENOL.—10s. per lb.

GERANIOL (PALMAROSA).—19s. per lb.

GERANIOL.—7s. 6d. to 10s. per lb.

HELIOTROPINE.—7s. per lb.

ISO EUGENOL.—12s. per lb.

LINALOL.—Ex Bois de Rose, 12s. per lb. Ex Shui Oil, 10s. per lb.

PHENYL ETHYL ACETATE.—11s. per lb.

PHENYL ETHYL ALCOHOL.—9s. 6d. per lb.

RHODINOL.—48s. per lb.

SAFROL.—2s. per lb.

TERPINEOL.—1s. 6d. per lb.

VANILLIN, EX CLOVE OIL.—13s. to 15s. per lb. Ex Guaiacol, 13s. to 14s. per lb.

Essential Oils

ALMOND OIL.—Foreign S.P.A., 10s. per lb.

ANISE OIL.—4s. 3d. per lb.

BERGAMOT OIL.—12s. 3d. per lb.

BOURBON GERANIUM OIL.—16s. 6d. per lb.

CAMPHOR OIL, WHITE.—160s. per lb.

CASSIA OIL, 80/85%.—4s. 9d. per lb.

CINNAMON OIL LEAF.—7s. 9d. per oz.

CITRONELLA OIL.—Java, 2s. 8d. per lb., c.i.f. U.K. port; pure, Ceylon, 2s. 6d. per lb.

CLOVE OIL (90/92%).—7s. per lb.

EUCALYPTUS OIL, AUSTRALIAN, B.P. 70/75%.—1s. 9d. per lb.

LAVENDER OIL.—Mont Blanc, 38/40%, 12s. 3d., per lb.

LEMON OIL.—7s. 6d. per lb.

LEMONGRASS OIL.—4s. per lb.

ORANGE, SWEET.—12s. 9d. per lb.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.*

London, February 13, 1930.

BUSINESS during the past week has been quite steady, with very little change in price. Export business has been good.

General Chemicals

ACETONE is firm at £71 10s. to £80 per ton, according to quantity

ACETIC ACID is in very good demand, with prices unchanged at £36 10s. per ton for 80% technical and £37 10s. per ton for 80% edible.

ACID CITRIC is slow at 2s. 1d. per lb., less 5%.

ACID LACTIC.—Unchanged at £43 per ton for 50% by weight, and in good demand.

ACID OXALIC is firm at £30 7s. 6d. to £32 per ton, according to quantity, and in good demand.

ACID TARTARIC.—The improvement in the demand continues, with price at about 1s. 3½d. per lb., less 5%.

ALUMINA SULPHATE is very firm at about £8 to £8 5s. for 17-18% iron-free quality.

ARSENIC.—Unchanged at about £16 5s. to £16 10s., free on rails at mines.

BORAX continues firm and unchanged at recently advanced prices.

CREAM OF TARTAR is in good request at about £104 per ton.

COPPER SULPHATE.—Unchanged at £28 per ton, less 5%.

FORMALDEHYDE is in steady request at £36 per ton.

LEAD ACETATE.—White about £44 per ton; brown about £43 per ton, and in regular demand.

LEAD NITRATE is steady at about £33 per ton.

LIME ACETATE.—Unchanged.

LITHOPONE.—Steady at £19 15s. to £23 per ton, according to quantity.

POTASSIUM CARBONATE.—£27 per ton for 96% to 98% arsenic-free quality, and in regular demand.

POTASSIUM PERMANGANATE remains firm and in good demand at 5½d. per lb. for B.P. needle crystals.

SODIUM ACETATE is steady at about £21 10s. to £22 per ton.

SODIUM BICHROMATE is firm at 3⅝d. per lb.

SODIUM HYPOSULPHITE.—Commercial crystals, £8 10s. to £9 per ton; photographic crystals, £14 to £15 per ton.

SODIUM NITRITE is in steady demand and firm at £20 per ton.

SODIUM PRUSSIATE continues firm at 4¾d. to 5¼d. per lb., according to quantity.

SULPHIDE OF SODIUM is very firm and unchanged.

TARTAR EMETIC.—There is a little better demand, with price at about 11d. per lb.

ZINC SULPHATE.—Unchanged, at about £13 10s. per ton.

Coal Tar Products

The coal tar product market continues to show improvement, although very gradually. Prices remain unaltered from last week.

MOTOR BENZOL is quoted at about 1s. 5½d. to 1s. 6d. per gallon, f.o.r.

SOLVENT NAPHTHA is quoted at about 1s. 2½d. to 1s. 3d. per gallon, f.o.r.

HEAVY NAPHTHA is unchanged at about 1s. 1d. per gallon, f.o.r.

CREOSOTE OIL remains at 3d. to 3½d. per gallon, f.o.r., in the North, and at 4d. to 4½d. per gallon in London.

CRESYLIC ACID is unchanged, the 98-100% quality being quoted at 2s. per gallon, and the dark quality, 95-97%, at 1s. 10d. per gallon, ex works.

NAPHTHALENES.—The firelighter quality is quoted at £3 10s. to £3 15s. per ton, the 74-76 quality at £4 to £4 5s. per ton, and the 76-78 quality at about £5 per ton.

PITCH.—The market remains dull at 45s. to 47s. 6d. per ton, f.o.b. East Coast port.

The following additional prices are reported :—

CARBOLIC ACID.—To-day's prices are from 7d. to 7½d. per lb., according to quantity. A fair amount of inquiry is noted and some business is being done.

ACETYL SALICYLIC ACID.—No change.

SALICYLIC ACID B.P. POWDER OR CRYSTALS.—No change.

METHYL SALICYLATE.—A fair amount of business is being done at the new price reported last week.

PHENOLPHTHALEIN.—Unchanged at 5s. 11d. to 6s. 1½d. per lb.

Nitrogen Fertilisers

SULPHATE OF AMMONIA.—*Export.*—The price remains steady at £8 5s. per ton, f.o.b. U.K. port, in single bags, for neutral quality 20/60 per cent. nitrogen. Now that the spring consuming season is approaching, less is heard of offerings of small quantities at low prices. Larger sales are now being reported in several continental countries. *Home Trade.*—It is understood that merchants have not yet commenced to place orders in any volume, but that a small demand is springing up in the South of England. A few days continuous sunshine will, no doubt, result in a very brisk demand.

NITRATE OF SODA.—It is reported that there has been some move out of this product, especially from Bristol and Plymouth, but up to the present sales in the U.K. are small. Stocks at various markets are heavy and there seems little inducement for consumers to cover their requirements early.

Latest Oil Prices

LONDON, February 11.—LINSEED OIL was very firm. Spot, ex mill, £44 10s.; February, £41 7s. 6d.; March-April, £40; and May-August, £39 7s. 6d., naked. RAPE OIL was inactive. Crude extracted, £38; and technical refined, £39 10s., naked, ex wharf. COTTON OIL was quiet. Egyptian crude, £27 10s.; refined common edible, £32; and deodorised, £34, naked, ex mill. TURPENTINE, was dull and 6d. per cwt. lower. American, spot, 43s.; March-April, 43s. 6d.

HULL, February 11.—LINSEED OIL.—Spot, £43 10s.; February, £42 15s.; March-April, £41 5s.; May-August, £40 5s. COTTON OIL.—Egyptian crude, spot, £26 15s.; edible refined, spot, £30; technical, spot, £29 10s.; deodorised, spot, £32. PALM KERNEL OIL.—Crude, naked, 5½ per cent., spot, £31 5s. GROUNDNUT OIL.—Crushed/extracted, spot, £33 10s.; deodorised, spot, £37 10s. SOYA OIL.—Extracted and crushed, spot, £37 10s.; deodorised, spot, £34. RAPE OIL.—Crushed/extracted, spot, £37 10s.; refined, spot, £39 10s. per ton. TURPENTINE.—Spot, 45s. 3d. per cwt., net cash terms, ex mill.

South Wales By-Products

SOUTH Wales by-product activities are slightly more satisfactory. There has been buying in most products and the immediate prospects are brighter. Welsh patent fuel manufacturers have come into the pitch market and are buying steadily, if moderately, for delivery at about 45s. per ton delivered. Solvent naphtha maintains its brighter tone and has a fair call at from 1s. 3d. to 1s. 5d. per gallon. Heavy naphtha remains quiet with values easy at from 11d. to 1s. 1d. per gallon. Road tar has a slightly better demand, but prices are unchanged at from 11s. to 14s. per 40-gallon barrel. Creosote remains weak at from 3d. to 4½d. per gallon. Refined tars are better, both coke-oven and gasworks tar being in good demand, but values are unchanged. Motor benzol is steady at from 1s. 4d. to 1s. 6d. per gallon. There has been a small call for sulphate of ammonia round about £10 per ton delivered. Patent fuel and coke exports continue to be moderate. Patent fuel prices are 22s. 6d. per ton, ex-ship Cardiff, and from 1s. to 1s. 6d. less per ton, ex-ship Swansea and Newport. Coke prices for furnace and foundry grades are unchanged at all South Wales ports.

Scottish Coal Tar Products

THERE is not a great deal of business passing at the present time in Scotland, but producers are in quite a comfortable position.

Cresylic Acid.—There is not a great deal available for prompt delivery, but prices are unaltered as follows: Pale 99/100%, 1s. 10½d. to 2s. 0½d. per gallon; pale 97/99%, 1s. 9½d. to 1s. 10d per gallon; dark 97/99%, 1s. 7¾d. to 1s. 8½d. per gallon; higher boiling, 1s. 9½d. to 1s. 11½d. per gallon, all f.o.r. works in buyers' packages.

Carbolic Sixties.—There is a better demand at level previously indicated, namely, 2s. 3d. to 2s. 5d. per gallon ex works.

Creosote Oil.—Unfortunately export orders are still non-existent. Values are weak as follows: Specification oil, 4d. to 4½d.; gas works ordinary, 2⅞d. to 3⅜d.; washed oil, 3d. to 3½d.; all per gallon free on rails works.

Coal Tar Pitch continues scarce in this district. Export value is nominal at 47s. 6d. to 50s. per ton, while 5s. per ton premium is easily obtained for home trade.

Blast Furnace Pitch is quieter than it has been for some time, and it is evident that merchants have lost interest since the recent control. Price is unaltered at 30s. per ton f.o.r. works for home trade and 35s. per ton f.a.s. Glasgow for export.

Refined Coal Tar is steady at 3⅞d. to 4¼d. per gallon ex works in buyers' packages. Orders for fair quantities continue to be placed.

Blast Furnace Tar is very dull at 2¾d. per gallon.

Crude Naphtha.—Production being small, price is nominal at 4¾d. to 5¾d. per gallon, according to quality.

Water White Products are firmer and any stocks which existed a few weeks ago have been sold. Motor benzole is quoted at 1s. 6¼d. to 1s. 6¾d. per gallon, and solvent 90/160 and heavy 90/190 naphthas at 1s. 2d. to 1s. 3d. and 1s. to 1s. 1d. per gallon, all f.o.r. works.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.*

Glasgow, February 12, 1930.

THE Scottish heavy chemical market has remained fairly steady since our last report, there being no demand for any particular materials. Export inquiry has been, if anything, a little more active. Prices remain practically unchanged.

Industrial Chemicals

ACETONE, B.G.S.—£71 10s. to £80 per ton, ex wharf, according to quantity. Inquiry remains satisfactory.

ACID ACETIC.—This material is still scarce for immediate supply but prices remain unchanged as follows: 98/100% glacial, £56 to £67 per ton, according to quality and packing, c.i.f. U.K. ports; 80% pure, £37 10s. per ton, ex wharf; 80% technical, £37 10s. per ton, ex wharf.

ACID BORIC.—Crystals, granulated or small flakes, £30 per ton. Powder, £32 per ton, packed in bags, carriage paid U.K. stations. There are a few fairly cheap offers made from the Continent.

ACID CARBOLIC, ICE CRYSTALS.—Quoted 8d. per lb. delivered.

ACID CITRIC, B.P. CRYSTALS.—Quoted 2s. per lb., less 5%, ex store, prompt delivery. Rather cheaper offers for early delivery from the Continent.

ACID HYDROCHLORIC.—Usual steady demand. Arsenical quality 4s. per carboy. Dearsenicated quality, 5s. 6d. per carboy, ex works, full wagon loads.

ACID NITRIC, 80° QUALITY.—£24 10s. per ton, ex station, full truck loads.

ACID OXALIC, 98/100%.—On offer at same price, viz.: 3¼d. per lb., ex store. Offered from the Continent at 3⅛d. per lb., ex wharf.

ACID SULPHURIC.—£2 15s. per ton, ex works, for 144° quality; £5 15s. per ton for 168°. Dearsenicated quality, 20s. per ton extra.

ACID TARTARIC, B.P. CRYSTALS.—Quoted 1s. 4d. per lb., less 5%, ex wharf. On offer for prompt delivery from the Continent at 1s. 4¼d. per lb., less 5%, ex wharf.

ALUMINA SULPHATE.—Quoted at round about £7 10s. per ton, ex store.

ALUM, LUMP POTASH.—Now quoted £8 7s. 6d. per ton, c.i.f. U.K. ports. Crystal meal about 2s. 6d. per ton less.

AMMONIA, ANHYDROUS.—Quoted 7½d. per lb., carriage paid. Containers extra and returnable.

AMMONIA CARBONATE.—Lump quality quoted £36 per ton. Powdered, £38 per ton, packed in 5 cwt. casks, delivered U.K. stations or f.o.b. U.K. ports.

AMMONIA LIQUID, 880°.—Unchanged at about 2½d. to 3d. per lb., delivered according to quantity.

AMMONIA MURIATE.—Grey galvanisers' crystals of British manufacture quoted £21 to £22 per ton, ex station. Fine white crystals offered from the Continent at about £17 5s. per ton, c.i.f. U.K. ports.

ANTIMONY OXIDE.—Rather easier and Spot material now obtainable at round about £34 per ton, ex wharf. On offer for prompt shipment from China at £30 per ton, c.i.f. U.K. ports.

ARSENIC, WHITE POWDERED.—Quoted £18 per ton, ex wharf, prompt despatch from mines. Spot material still on offer at £19 15s. per ton, ex store.

BARIUM CHLORIDE.—In good demand and price about £11 per ton, c.i.f. U.K. ports. For Continental material price would be £10 per ton, f.o.b. Antwerp or Rotterdam.

BLEACHING POWDER.—British manufacturers' contract price to consumers unchanged at £6 12s. 6d. per ton, delivered in minimum 4-ton lots. Continental now offered at about the same figure.

CALCIUM CHLORIDE.—Remains unchanged. British manufacturers' price, £4 15s. per ton to £5 5s. per ton, according to quantity and point of delivery. Continental material on offer at £3 12s. 6d. per ton, c.i.f. U.K. ports.

COPPERAS, GREEN.—Unchanged at about £3 10s. per ton, f.o.r. works or £4 12s. 6d. per ton, f.o.b. U.K. ports.

FORMALDEHYDE, 40%.—Now quoted £35 per ton, ex store. Continental material on offer at about £34 per ton, ex wharf.

GLAUBER SALTS.—English material quoted £4 10s. per ton, ex station. Continental on offer at about £3 5s. per ton, ex wharf.

LEAD, RED.—Price now £37 10s. per ton, delivered buyers' works.

LEAD, WHITE.—Quoted £37 10s. per ton, c.i.f. U.K. ports.

LEAD ACETATE.—White crystals quoted round about £39 to £40 per ton, ex wharf. Brown on offer at about £2 per ton less.

MAGNESITE, GROUND CALCINED.—Quoted £8 10s. per ton, ex store. In moderate demand.

METHYLATED SPIRIT.—Industrial quality 64 O.P. quoted 1s. 4d. per gallon, less 2½%, delivered.

POTASSIUM BICHROMATE.—Quoted 4⅝d. per lb. delivered U.K. or c.i.f. Irish ports, with an allowance for contracts.

POTASSIUM CARBONATE.—Spot material on offer at £26 10s. per ton, ex store. Offered from the Continent at £25 5s. per ton, c.i.f. U.K. ports.

POTASSIUM CHLORATE, 99¾/100%.—Powder quoted £25 10s. per ton, ex wharf. Crystals 30s. per ton extra.

POTASSIUM NITRATE.—Refined granulated quality quoted £19 2s. 6d. per ton, c.i.f. U.K. ports. Spot material on offer at about £20 10s. per ton, ex store.

POTASSIUM PERMANGANATE, B.P. CRYSTALS.—Quoted 5½d. per lb., ex wharf.

POTASSIUM PRUSSIATE (YELLOW).—Spot material quoted 7d. per lb., ex store. Offered for prompt delivery from the Continent at about 6¾d. per lb., ex wharf.

SODA, CAUSTIC.—Powdered, 98/99%, £17 10s. per ton in drums, £18 15s. per ton in casks. Solid, 76/77%, £14 10s. per ton in drums, and £14 12s. 6d. per ton for 70/72% in drums, all carriage paid buyers' stations, minimum 4-ton lots, for contracts 10s. per ton less.

SODIUM BICARBONATE.—Refined recrystallised, £10 10s. per ton, ex quay or station. M.W. quality 30s. per ton less.

SODIUM BICHROMATE.—Quoted 3⅝d. per lb., delivered buyers' premises with concession for contracts.

SODIUM CARBONATE. (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station. Powdered or pea quality 27s. 6d. per ton extra. Light soda ash £7 13s. per ton, ex quay, minimum 4-ton lots with various reductions for contracts.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture quoted £8 17s. 6d. per ton, ex station, minimum 4-ton lots. Pea crystals on offer at £14 15s. per ton, ex station, minimum 4-ton lots. Prices for this year unchanged.

SODIUM NITRATE.—Chilean producers are now offering at £9 9s. per ton, carriage paid buyers' sidings, minimum 5-ton lots, but demand in the meantime is small.

SODIUM PRUSSIATE.—Quoted 5¼d. per lb., ex store. On offer at 5d. per lb., ex wharf, to come forward.

SODIUM SULPHATE (SALTCAKE).—Prices 55s. per ton, ex works, 57s. 6d. per ton delivered for unground quality. Ground quality 2s. 6d. per ton extra.

SODIUM SULPHIDE.—Prices for home consumption. Solid, 60/62%, £9 15s. per ton. Broken, 60/62%, £10 15s. per ton. Crystals, 30/32%, £7 17s. 6d. per ton, all delivered buyers' works on contract, minimum 4-ton lots. Special prices for some consumers. Spot material 5s. per ton extra.

SULPHUR.—Flowers, £12 per ton; roll, £10 10s. per ton; rock, £9 5s. 0d. per ton; ground American, £9 5s. per ton, ex store.

ZINC CHLORIDE, 98%.—British material offered at round about £20 per ton, f.o.b. U.K. ports.

ZINC SULPHATE.—Quoted £10 per ton, ex wharf.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

The Hurrell Homogeniser

An Increasing Demand

AN indication of the increased use of the Hurrell Homogeniser is the fact that the much larger works at Woolwich Road, Charlton, to which G. C. Hurrell and Co., Ltd., removed their plant two years ago, is, in spite of being equipped with the maximum amount of machinery, working an overtime shift three parts of the year.

The demand from different parts of the world steadily increases, not only for homogenisers, but for their new development in the form of a pressure type emulsifier of very simple construction. One of the most effective types of emulsifier or homogeniser consists of a battery of high pressure pumps forcing the oil and water mixture past a valve which has a minute clearance from its seat—in other words, a positive pump and a leaky valve. The inventor of the "Hurcol" emulsifier has taken a short cut and secured the same result by the direct use of a pump in which there is a slight clearance between the plunger and the barrel.

Amongst the outstanding advantages of this type of emulsifier are simplicity of parts, slow movement, capacity for lifting from and delivering to a certain height, and an entire absence of entrained air in the emulsion. The principal use for this machine up to the moment is, according to the manufacturers, in the production of emulsions of edible fats for the enriching of breadstuffs.

Manchester Chemical Market

(From Our Own Correspondent.)

Manchester, February 13, 1930.

A fair business has been done this week in certain descriptions of heavy chemicals on the Manchester market, and with the possible exception of one or two lines there is no indication of products generally departing from the steadiness which has been a characteristic of the market for some time. Interest is being taken in the Lancashire Cotton Fair, which opened here on Tuesday, as a possible means of stimulating the consumption of cotton textiles and thereby indirectly the trade in chemicals.

Heavy Chemicals

Chlorate of soda is the subject of a moderate amount of buying interest and values in this section are held at from about £25 to £27 per ton, ex store, and according to quantity. Caustic soda is selling in fair quantities, and there is a quietly steady call for the material against contracts, with prices firm on a contract basis of from £12 15s. to £14 per ton. Offers of bicarbonate of soda are at round £10 per ton, and not unsatisfactory sales are being made. Bichromate of soda is maintained on the basis of 3⅜d. per lb., and business in this section keeps up at a fair level. Only a relatively quiet trade is being put through in the case of phosphate of soda, values of which during the past week have been at round £11 5s. per ton. Alkali meets with some inquiry, and contract prices for this are well held at about £6 per ton. There has been no further change in the price position of sulphide of sodium, although at the moment demand is on rather quiet lines; the commercial quality is quoted at from £8 2s. 6d. to £9 2s. 6d. per ton, according to quantity, and the 60–65 per cent. concentrated solid material at from £10 to £14. Hyposulphite of soda is in moderate request, with the tone steady at round £15 per ton for the photographic grade and from £9 to £9 10s for the commercial.

Permanganate of potash is moving only in comparatively small quantities at the moment, and offers are fairly steady at about 5¼d. per lb. for the commercial stuff and up to 5½d. for the B.P. Bichromate of potash is in fairly steady demand at firm rates, these being on the basis of 4⅜d. per lb., less discounts, according to quantity. A quiet demand has been reported this week in the case of carbonate of potash, sales of which are being made at round £26 per ton. With regard to caustic potash, inquiry is not too active, but at about £31 10s. per ton prices seem to be holding their own. Yellow prussiate of potash is on offer at from 6¾d. to 7¼d. per lb., according to quantity, and a fair amount of buying interest in this material is being shown. Chlorate of potash is on the quiet side, but values are steady at from £26 to £28 10s. per ton.

Inquiry for arsenic is said to have been a little more lively than of late with, however, quotations unchanged at £16 per ton at the mines for white powdered, Cornish makes. Sulphate of copper is obtainable at down to about £26 5s. per ton, f.o.b., and the demand for the material this week has been very moderate. A quiet business is going through in the acetates of lime, with the grey quality quoted at £16 per ton and the brown at about £7 10s. The lead acetates are on the slow side, although virtually unchanged compared with a week ago at £39 per ton for white and £38 10s for brown, with nitrate of lead in a somewhat similar position at £33.

Acids and Tar Products

There is a quietly steady demand about for acetic acid, and prices are firm at £66 per ton for the glacial and round £36 for the 80 per cent. commercial grade. Oxalic acid is attracting a fair amount of attention, and at £1 13s. per cwt., ex store, offers keep firm. Citric acid is on the slow side, and although perhaps not quotably changed on balance, the tendency is still not too strong. Tartaric acid meets with some inquiry at about 1s. 3¼d. per lb.

Pitch maintains its steadiness at 47s. 6d. per ton., f.o.b., but bookings this week have not been extensive. The demand for creosote oil is very moderate, with offers at round 4d. per gallon, naked. Carbolic acid is held at 2s. 6d. per gallon, naked, for crude, and 7¼d. per lb. for crystals, with demand on quietly steady lines. Current offers of solvent naphtha are in the neighbourhood of 1s. 2¾d. per gallon, a fair quantity being taken up.

Company News

Stocal Enamels, Ltd.—Net profits for 1929 were £22,366, and a final dividend of 5 per cent., making 7½ per cent., is proposed, carrying forward £9,494, against £2,095.

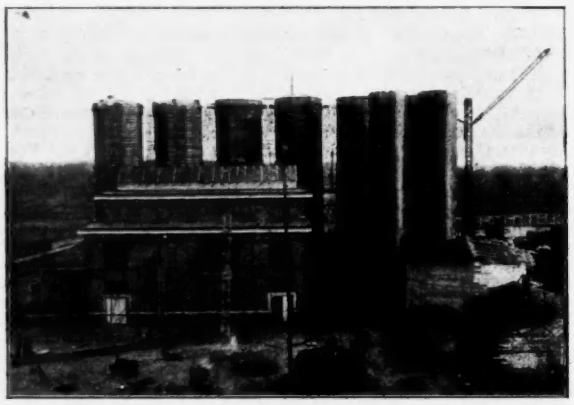
Borax Consolidated, Ltd.—The directors have decided that they are unable to recommend the payment of a dividend on the deferred ordinary shares for the year ended September 30, 1929. Last year a dividend of 7½ per cent. was paid.

Timothy Whites (1928), Ltd.—Resolutions to increase the capital of the company from £1,500,000 to £2,000,000 by the creation of 476,000 7½ per cent. cumulative preferred ordinary shares of £1 each and 480,000 deferred ordinary shares of 1s. each were unanimously approved at meetings of the shareholders in London on Tuesday.

Benzol and By-Products, Ltd.—Trading profit to September 30 totalled £27,110, plus interest, etc., of £6,070 (against £12,689 and £7,529 respectively for 1927–28). After making full allowance for depreciation and all expenses, the result is a loss of £7,624, against a loss of £21,195. The deficit brought forward was £17,000. Adding the loss for the year and £1,041 transferred to sinking fund there remains a net loss of £25,667. The report states that while the coal and coke industries showed some improvement, depression in the by-products market increased. Consequently the directors regret it has not been possible to pay the dividend on the 6 per cent. cumulative participating preference shares, these being in arrears since September 30, 1926. The meeting will be held at 18, Grosvenor Gardens, S.W., on February 17.

A New Nitric Acid Plant

An extensive nitric acid plant, of which a photograph appears below, has recently been erected by Bamag-Meguin (Great Britain), Ltd., of Broadway Buildings, Broadway, London, S.W.1, for the Royal Dutch Petroleum Co. at Ymuiden,



Holland. This unit forms a part of the complete synthetic ammonia factory operating on the Mont-Cenis process of ammonia synthesis. The capacity of the nitric acid plant corresponds to an output of 12 tons of nitrogen per 24 hours.

Norwegian Exports of Aluminium

The following figures have been published for the Norwegian export of aluminium in the first nine months of 1929, with comparative figures for the similar periods of 1928 and 1927:—

Destination	Tons. 1929	1928	1927
Sweden	364	1,084	581
Russia	3,907	872	1,857
Belgium	449	473	1,136
Great Britain	11,337	7,564	7,379
Japan	1,214	1,067	863
United States	3,361	1,120	3,083
Italy	70	92	254
Spain	76	164	161
Germany	1,449	473	538
The Netherlands	—	17	—

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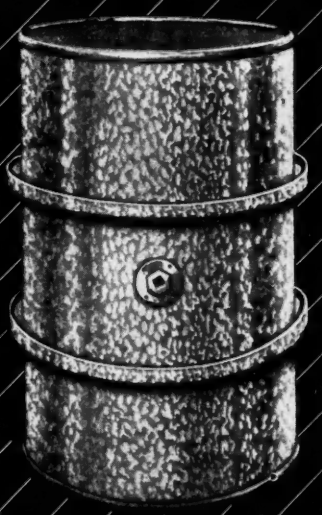

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"C.A." Queries

We receive so many inquiries from readers as to technical, industrial, and other points, that we have decided to make a selection for publication. In cases where the answers are of general interest, they will be published; in others, the answers will simply be passed on to the inquirers. Readers are invited to supply information on the subjects of the queries:—

Chemical Ware for India.—The head of the chemistry department of a university college in India desires to be put in touch with suppliers of (1) laboratory sinks of yellow glazed earthenware and the ordinary white kind, and (2) stainless steel water taps.

Refractory Ware.—A London firm is anxious to find a firm within fairly easy reach of London which manufactures refractory ware for the gas or electrical trades, or unglazed fired about 1,500° C.

Appointments Vacant

APPLICATIONS are invited for the following appointments, on or before the dates mentioned:—Three research assistants in the Department of Coal Gas and Fuel Industries of the University of Leeds—The Registrar, The University, Leeds (February 24). A lecturer in chemistry at Raffles College, Singapore—The Private Secretary (Appointments), Colonial Office, 2, Richmond Terrace, Whitehall, S.W.1 (February 28). Three research assistants under the British Cotton Research Association—Dr. R. H. Pickard, Shirley Institute, Didsbury, Manchester. Temporary assistant chemists at the Government Laboratory, Clement's Inn Passage, London (February 22). Technical assistant, with experience in chemical engineering, with special reference to the manufacture of explosives, for the War Office, Whitehall, London (February 22).

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

CHEMICALS FOR INDIA.—H.M. Trade Commissioner in Calcutta reports that the Indian Stores Department is calling for tenders, to be presented in New Delhi by February 18, 1930, for the supply of liquid chlorine, alumina-ferric and sulphate of alumina. (Order No. H.6860). Reference No. B.X. 6143.

DISINFECTING FLUID FOR INDIA.—H.M. Trade Commissioner at Calcutta reports that the Indian Stores Department is calling for tenders, to be presented in New Delhi by February 24, 1930, for the supply of disinfecting fluid. (Order No. H.6927). Reference No. B.X. 6143.

Acetone Production in Italy

Difficulties of Butyl Alcohol Disposal

ACCORDING to an article in *L'Industria Chimica*, the production of acetone in Italy by the fermentation process has raised a problem with regard to the disposal of the butyl alcohol obtained simultaneously (the proportions being one part of acetone to two of the alcohol). In order to render the process economic, sufficient outlets for the butyl alcohol must be found, and it is now suggested that it should be used for denaturing alcohol. Italian production of the latter in the financial year 1926–27 amounted to 213,297 hectolitres, and has probably increased by now to 250,000 hectolitres: so that the use of a minimum of 2 per cent. of butyl alcohol as a denaturant would require 5,000 hectolitres of the latter.

In 1928 and 1929 Italy, apart from her own production, imported much material for denaturing purposes. The use of 5,000 hectolitres of butyl alcohol for the purpose would correspond to a production of half as much acetone, which would cut the imports of the latter down to about half of their present value. At the moment, the denaturants in greatest demand are acetone oil, crude methyl alcohol, crude benzene, and acetone.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

County Court Judgments

[NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.]

HERMOLINE PRODUCTS LTD., Vine Street Chambers, Nelson, chemists, etc. (C.C., 15/2/30.) £51 6s. January 9.

McINTYRE, Thomas, 32, Chester Street, Liverpool, soft soap manufacturer. (C.C., 15/2/30.) £17 13s. 4d. January 8.

NIXON, Mr. R., 314, Lower Broughton Road, Salford, soap manufacturer. (C.C., 15/2/30.) £12 4s. 6d. January 10.

Mortgages and Charges

*[NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case, the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.]*

DISTAS, LTD., London, W., disinfectant merchants. (M., 15/2/30.) Registered January 29, £250 debentures, to F. E. Gibson, 53, Walm Lane, Cricklewood, company director; general charge.

HARDING'S DYE WORKS, LTD., Kingston-on-Thames. (M., 15/2/30.) Registered January 30, mortgage to Bank; charged on 122, Acre Road, Kingston-on-Thames. *Nil. October 19, 1929.

RYDING AND CO. (TRAFFORD PARK) LTD., chemical manufacturers. (M., 15/2/30.) Registered January 30, £3,000 debentures; general charge. *——. March 15, 1929.

London Gazette, &c.

Notice of Dividend

ADCOCK, Robert Page (trading as ACME SOAP AND CHEMICAL COMPANY), 41, Oakfield Street, Cardiff, Glamorgan, oil and soap merchant. First and final dividend, 10¾d. per £, payable, February 17, Official Receiver's office, 34, Park Place, Cardiff.

Partnership Dissolved

WALKDEN MAKIN AND CO. (George CHADWICK, Arthur CHADWICK and George TAYLOR), bleachers, dyers and finishers, Clayton Dye Works, Openshaw, Manchester, by mutual consent, as from January 31, 1930, so far as regards G. Taylor, who retires from the firm. Debts received and paid by G. Chadwick and A. Chadwick, who are continuing the business.

New Companies Registered

NITH DYEING AND FINISHING CO., Shaddon Works, Carlisle. Registered as a "public" company on February 7. Nominal capital, £100,000 in £1 shares. To acquire the dyeing and finishing branch of the business of the Solric D'fyson Fabrics, Ltd., of Shaddon Works, Carlisle, at Troqueer Mills, Maxwelltown, Kirkcudbrightshire, and also to carry on the manufacture of chemicals, vitriol, bleaching and dyeing materials, etc. Directors: W. Paton, W. Morton, G. Morton, H. C. Banton, G. Daley.

PHENYLDENT PROPRIETARIES, LTD., 349, Buxton Road, Stockport. Registered February 7. Capital, £1,000 in £1 shares. To carry on the business of manufacturing chemists and druggists and manufacturers and distributive agents of Phenyldent productions and other patent medicines. Directors: W. Harrop and T. J. V. Parry.